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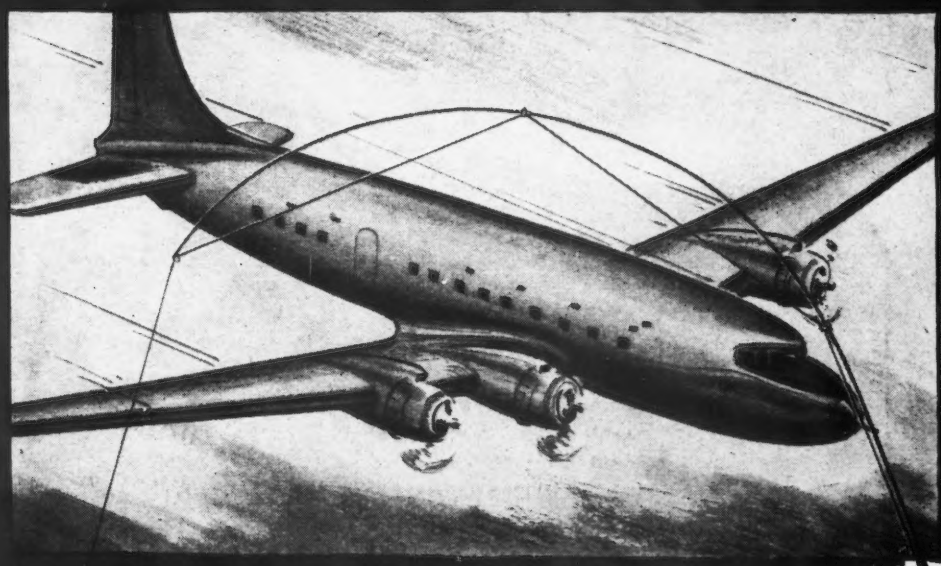

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Mr. Taft's Bitter Pill

THE evolution of Mr. Taft's labor bill has been a capsule demonstration of democracy in action. The formative period has been slow and agonizingly deliberate. A gush of verbal shadow-boxing has attended every comma and nuance. As laid on the President's desk late this week, it will bear not only the imprint of Mr. Taft's determination and courage, but also embodies a whole host of reasoned compromises dictated by political expediencies and by party moderates such as Ives, Morse, Aiken, Tobey and Lodge.

This bill certainly won't stop strikes. Strikes can only be stopped at the end of a bayonet in an all-powerful police state. But it does nicely balance some of the excesses of the Wagner Act of 1935 and establishes more equitable relationships for collective bargaining. There can, and should be, some concern for the section which legalizes a greater role of government intervention in strikes involving essential industries. Such intervention poses certain long-term threats to management and labor, and both parties may well find it to their mutual advantage to devise and develop voluntary agreements setting up machinery to break deadlocks.

Labor leaders may publicly grimace and gag at Mr. Taft's pill. But in combination with the Wagner Act, it can hardly be considered a completely unpalatable dosage. It's somewhat bitter in spots, but certainly has none of the lethal wallop of the Draconian brew compounded by Congressman Hartley in the lower House.

There is no curbing of industry-wide bargaining. The closed shop is killed, but the union shop survives on vote of the workers and is a legitimate subject for bargaining with an employer. Unions will be required to file financial reports, and certain unfair union practices are defined and subject to suit for financial penalization. Massed picketing is not banned, but workers are assured access to struck plants. There is restriction and supervision of corporate contributions to union welfare funds and prohibition of union coercion of members. Employer propaganda is permissible just so long as there is no threat of reprisal against employees. A union will lose its rights if an officer is adjudged a communist, the involuntary check-off is banned, and there is financial liability for damages resulting from strikes and secondary boycotts.

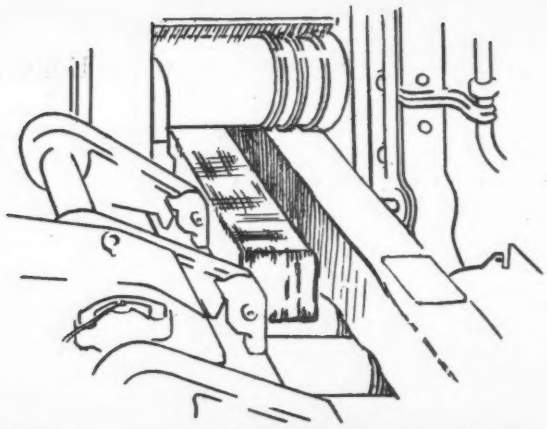
The government is given the weapon of injunction to delay strikes in essential industry, but private employers are denied this weapon. Labor spokesmen say this is a subterfuge, whereby the employer would file a charge with the Labor Board and it in turn would get the injunction. If this were to be true it would closely approximate involuntary servitude and would certainly generate widespread unrest. A new five-man Labor Board is established. It is to be hoped that this Board does not become a common haven of refuge for both employers and employees as an alternative to what develops at the collective bargaining table.

As in all law, public opinion will be the final arbiter as to permanency of certain provisions. Many of the provisions are subject to great abuse, and, on the other hand, union ingenuity will certainly devise ways of circumventing some. It will be interesting to observe developments in those instances where financial penalties are levied against unions which have little or no money in their treasuries.

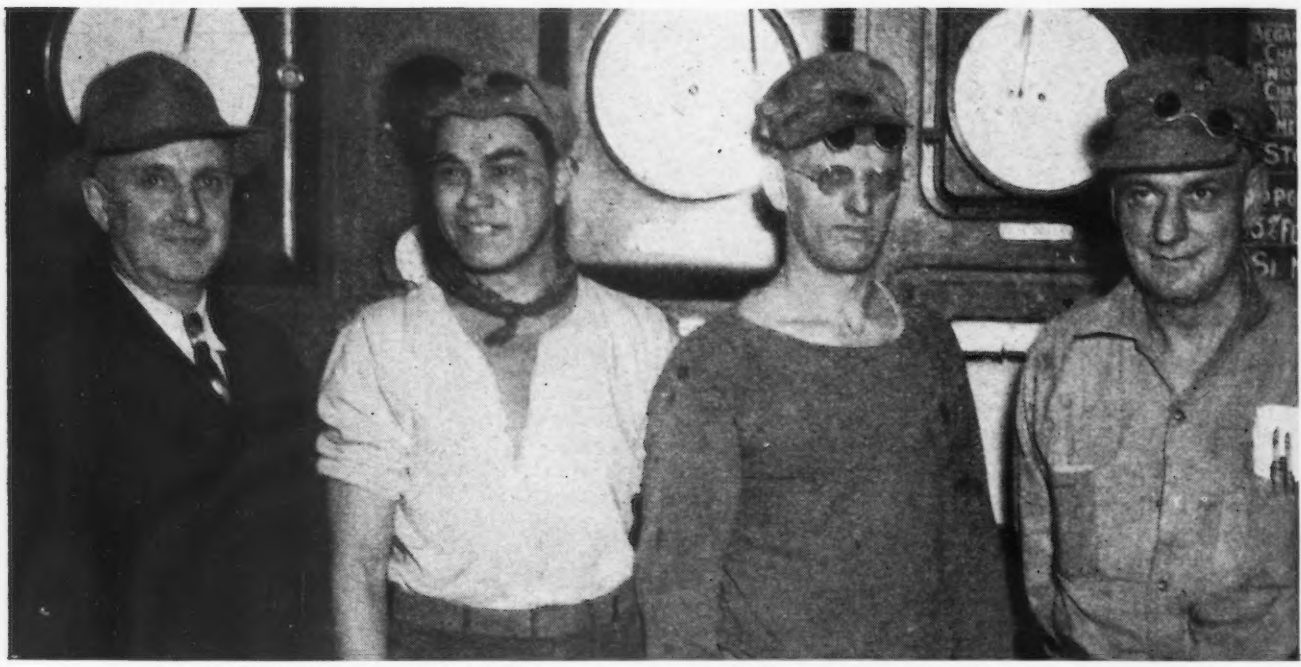
President Truman may surprise most observers and sign the bill.

As in the Portal decision, he may well take the unusual step of appending his own interpretations of ambiguous passages. These interpretations hardly can be ignored by the courts which soon will be construing the Act and testing its constitutionality.

T. W. Lippert



Inland's 60,000,000th Ton of Steel...



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► If the pending labor legislation is passed without much modification, with or without a veto, it will represent a consolidation of objective management-labor trends since the last depression. Neither side will be satisfied--management wants more restrictions, labor wants less. But all in all, industrial relations men will be privately satisfied while labor will eventually realize it was lucky to get off so lightly.

► Contrary to popular impression, big trailer trucks don't always stop as fast as passenger cars. American Trucking Assn. tests of a car v. an air brake-equipped truck-trailer showed the car could stop in 22 ft from 20 mph while the truck trailer combination required 52 ft owing to brake lag.

► A camera with a speed of one-millionth of a second which produces a finished photographic projection within 30 sec after the picture is taken has been developed by GE. It is not portable, but has been designed as part of equipment for testing electric power apparatus by means of electric power surges.

► The rush to capture the new recorder field is on. Two new types are being pushed. The Webster wire recorder is expected to be on the market this month at about $150. Brush Development Corp.'s tape machine is available now at $229.50. A Philadelphia concern will soon start mass production of a metallized paper tape machine under license from Armour Research Foundation.

► Pratt & Whitney will produce the Rolls-Royce Nene, most powerful jet engine yet revealed, to power a new Navy Grumman carrier based fighter. The Nene engine was designed and built during the war and is more powerful than the Rolls-Royce Derwent jet which powered the record-breaking Gloster Meteor.

► Manufacturers who take inventory on June 30 may find it a "Stop, look and listen!" sign. And from the facts discovered at that time may come holdups on orders, revisions of requirements or outright cancellations. How much this may affect steel tonnages remains to be seen but that some action will be taken as a result of inventory results is a foregone conclusion.

► Tests conducted by U. S. Rubber Co. indicate that butyl bicycle tire tubes hold air from three to ten times longer than natural rubber tubes. A balloon tire bicycle tube inflated to 35-lb pressure lost only 2½ lb in 28 days. Under the same conditions a natural rubber tube lost 24 lb.

► A new lightweight rotary refrigeration mechanism for commercial and industrial applications that weighs only 85 lb is being introduced by Frigidaire.

► A definite break in used car prices is indicated for this summer or early fall. A recent survey showed that 75 pct of used car trading in the past few months has been between dealers, while in some cases the market has been as high as 90 pct wholesale.

► The steel scrap market is now back to normal in its movements. Sharp upward or downward swings lasting for weeks are now improbable. When or if the deep drop in steel output arrives it can be safely assumed that the market will anticipate this recession by a few months at least.

► Army Ordnance will specify a new drive system in multi-wheel-drive vehicles to disengage front wheels when rounding curves on hard surfaces. An over-running clutch and non-constant velocity universal joint eliminate wind-up and increase steering radius, reducing wear on tires and mechanical parts.

► The first transatlantic flight of a plane fitted with the new Speedpak took place on a KLM liner last week. The all metal belly cargo carrier, which weighs only 1700 lb empty, carries 5 tons and cuts down the speed of a Constellation only 10 mph.

► Mobile telephone service recently installed in trucks of the City Pattern Foundry & Machine Co., Detroit, is reported to have greatly increased the efficiency of its truck delivery and pickup service.

Gas Heating Speeds S

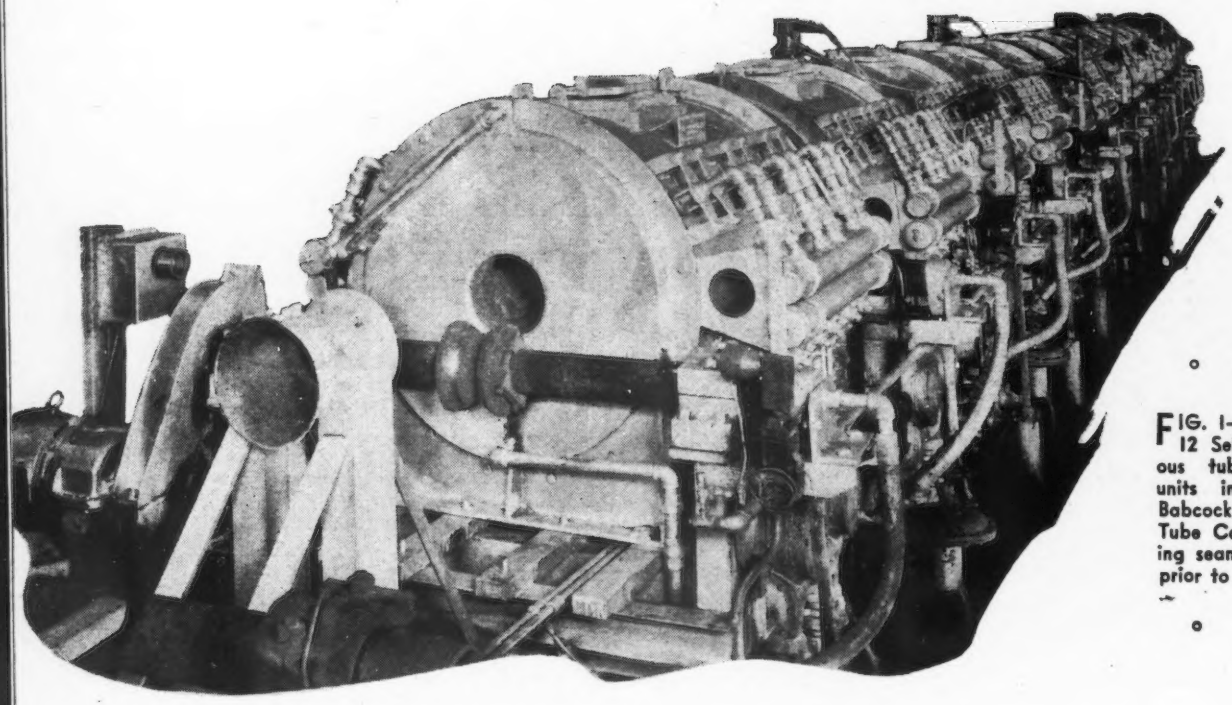


FIG. 1—Battery of 12 Selas continuous tube heating units installed at Babcock & Wilcox Tube Co. for heating seamless tubing prior to final sizing.

By E. S. KOPECKI
Metallurgical Editor, The Iron Age

INTRODUCTION of high-speed gas heating into the seamless tube production line appears to have established a new approach to efficient, economic processing methods that may well effect other phases of the metalworking industry. Advantages derived from the continuous operation of such a unit, automatically controlled, at Babcock & Wilcox Tube Co., Beaver Falls, Pa., during the past year, indicate the tremendous possibilities that can be realized from high-speed, direct heating with gas.

Having largely overcome the bugs that invariably confront a pioneer, the company is now realizing advantages such as; (1) reduced operating cost, (2) increased output, and (3) improved quality, in its production of seamless tubing. Of particular value is the drastic reduction in fuel consumption—from $1.26 to $0.46 per ton tubing—in the heating for final sizing operation.

In the process of manufacturing seamless tubing, it is necessary to perform a reheating operation prior to sinking (final tube sizing at high temperature). This is required because of the drop in metal temperature, during the early stages of tube formation, to about 1200° to 1400°F. The tubing must be reheated to about 2000° to 2200°F, depending on the type steel used, to obtain satisfactory results in the sinking mill. Carbon steels, bearing (SAE 52100) steels, B & W Croloy and Nitralloy steels, copper-bearing steels, high manganese steel, carbon-molybdenum steels, and all types stainless steels are currently used in tube production with no adjustments other than to correct for the temperature of the tubing leaving the furnaces and entering the sinking mill.

The heating installation responsible for attaining the above-mentioned results, see fig. 1, is an assembly (in series) of 12 Selas[1] continuous tube heating units—they can scarcely be called furnaces, due to their lack of size—equipped with Bailey Meter Co. controls, which not only bring the tubes up to desired heat, but do so at speeds commensurate with production requirements. The rated speeds for tube heating, 50 fpm (min) to 150 fpm (max) for 4-in. OD tubing, and 54 fpm (min) to 162 fpm (max) for 6-in. OD tubing, are sufficient to handle the entire output of the piercing mill. As a matter of fact, the full capacity of the furnace assembly, 42,000 cu ft per hr (natural gas), has never as yet been utilized. With tubing passing through the furnaces at full production speeds, only an average of about 12,000 cu ft per hr

[1] *Gradiation Process—Selas Corp. of America tradename*

Seamless Tube Production . . .

Reduced operating costs, increased output and improving quality, have been reported by the Babcock & Wilcox Tube Co. in the production of seamless tubing, utilizing high-speed gas heating. The heating unit, completely automatically controlled, performs a heating operation at tube-production speeds, and at one third the fuel costs required by conventional heating methods. Other advantages to be derived are flexibility of operation and savings in labor costs and floor space requirements. Operating data covering approximately 1 year's performance are also included.

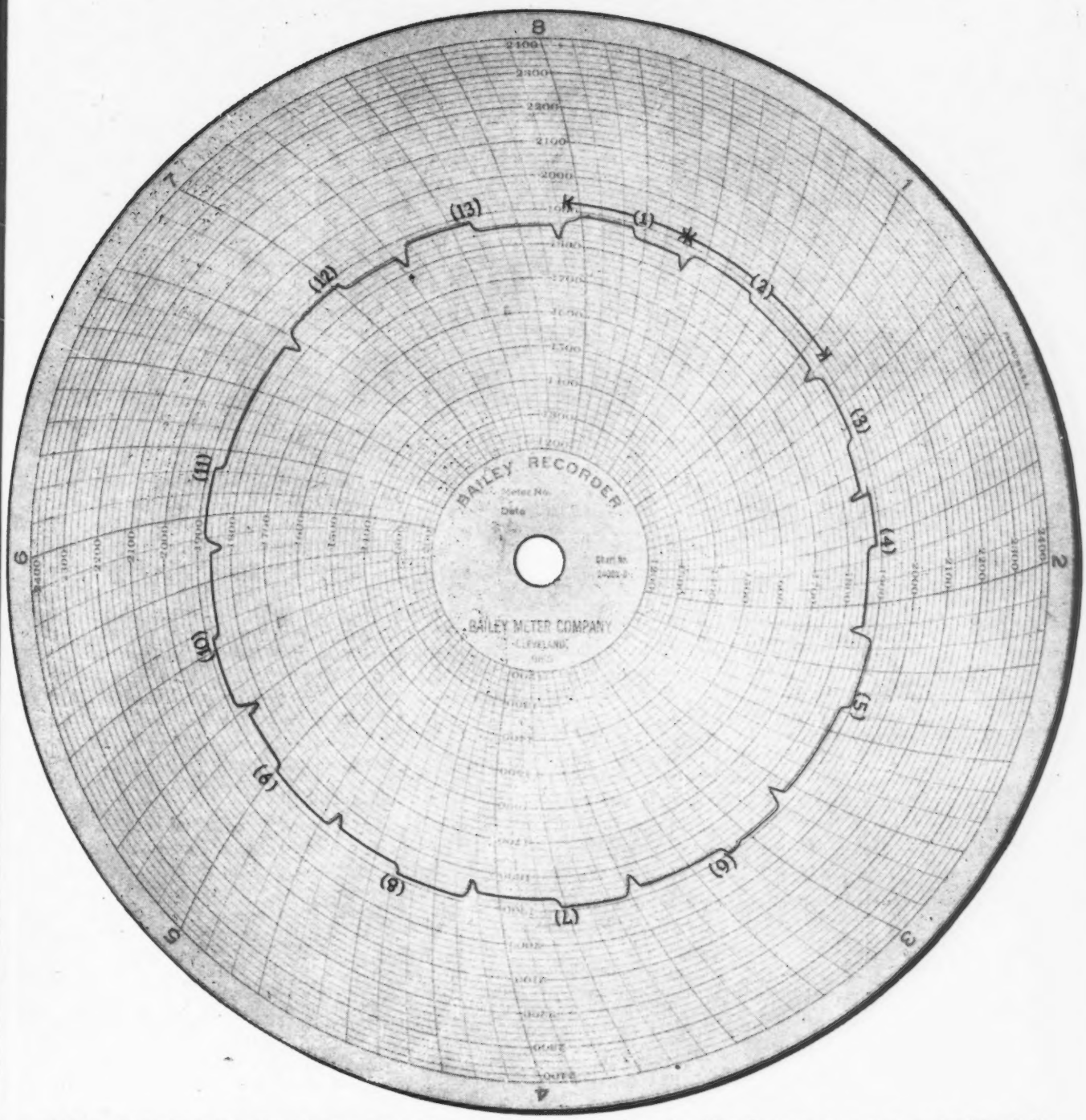


FIG. 2—An 8-min control chart indicating the final temperatures of 13 seamless tubes (identified as 1, 2, 3, etc.) passing through the furnace assembly in rapid succession. The variation in temperature from one end of any individual tube to the next does not exceed 20°F.

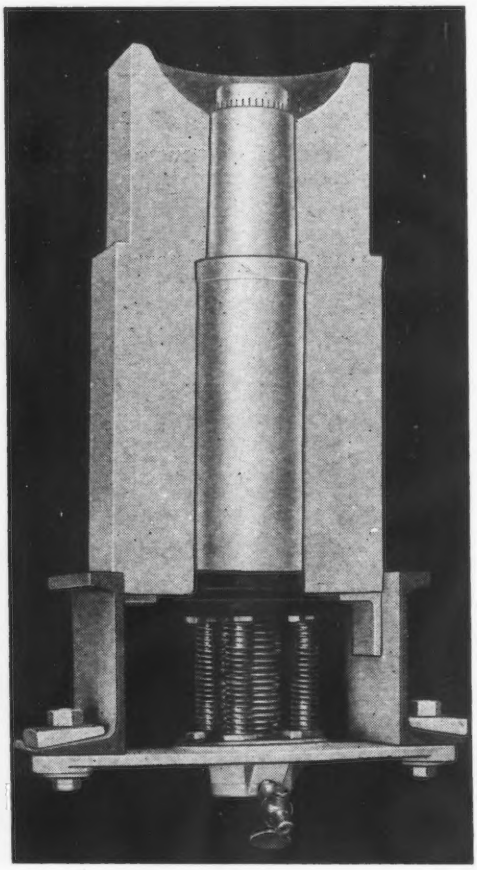


FIG. 3—Cutaway view of one of the high temperature gas heat sources which produce rapid heating. All combustion takes place in the cup-like concavity. Incoming fuel is ignited at the apertures located at the tip and multiple radial flames cause the walls of the cup to become white hot. Uniform incandescence develops radiant heat in addition to heat contained in fully burned products of combustion.

(natural gas), less than one third full capacity, is consumed.

The economy of the continuous tube heating furnace as compared with the furnace installation previously utilized for this particular operation, is outstanding. This can best be illustrated by the data listed in table I, which have been compiled by B&W, based on a total of 1381 hr continuous firing (902 hr under operating conditions and 479 hr idling) for the previous furnace, and 1109 hr continuous firing (655 hr under operating conditions and 454 hr idling), during which a total of 9693 tons of tube stock were heated with the previous furnace and 7853 tons with the Selas furnace installation. For the purpose of analyzing the data in table I, the term "idling" refers to the periods of time during which no work is passing through the furnaces.

TABLE I

Operating Data for Tube-Heating Cycle Prior to Final Sizing

	Previous Heating Unit	Selas Heating Furnace
Natural gas used per ton tubing heated, cu ft	3,705	1,364
Natural gas used per ton tubing heated (operating conditions), cu ft	2,662	1,051
Natural gas used per ton tubing heated (idling), cu ft	1,043	313
Natural gas cost per ton tubing heated	$1.26	$0.46
Natural gas consumed (operating conditions), cu ft per hr	28,605	12,604
Natural gas consumed (idling conditions), cu ft per hr	21,092	5,410
Number of tubes heated per producing hour	67.04	72.09
Tons of tubing heated per producing hour	10.74	11.99

Analysis of the data in table I indicates one of the drawbacks of conventional furnaces, in that almost as much fuel is required to maintain a furnace at heat when idling, as is necessary when work is passing through.

The economy of the Selas unit is readily observed from the fact that not only is the fuel consumption less than one half when compared with conventional furnace practice on a working basis (12,604 cu ft per hr as compared with 28,605 cu ft per hr), but the fuel consumption is less than one fourth under idling conditions (5410 cu ft per hr as compared with 21,092 cu ft per hr.) A rather startling fact is that the total fuel consumed by the Selas heating units under operating conditions is only slightly more than one half the fuel consumption of the previous conventional furnace installation when idling. Since production costs can best be compared when brought down to unit values, the data to be considered lie in actual fuel costs per ton tubing produced, i.e., $0.46 for the Selas assembly, $1.26 for the previous installation.

Another important advantage lies in the ability of the Selas unit to absorb greater piercing mill productive capacity than the previous heating furnace. This is borne out in table I by the 11.99 tons tubing heated per producing hour by the Selas method as compared with 10.74 by the latter.

Flexibility of Operation

A production process, no matter how economical, is of no avail unless satisfactory results can be attained. It is in this connection that the Selas continuous tube heating furnace teamed with the Bailey Meter control system particularly distinguish themselves. Considering that tubing of different sizes and wall thicknesses (4-in. OD and 6-in. OD have wall thicknesses of 0.134 and 0.625 in., respectively) enter the furnaces at varying temperatures and must exit from the furnace at a specified temperature, at production speeds, it is important to realize the prominent role played by the quick-acting controls. Not only is the temperature of the tubing itself, as it enters the sinking mill, of primary concern, but it is also of importance that each tube be at a uniform temperature, from end to end. These factors bear a heavy influence on the results obtained in the sinking operation, especially as regards size specifications.

Fig. 2 is an 8-min control chart indicating the final temperatures of 13 tubes passing through the furnaces in rapid succession. As shown on the chart, the variation in temperature, from one end of any individual tube to the other, does not exceed 20°F. This slight variation is not sufficient to affect in any manner the favorable results obtained in the subsequent sizing operation.

The combustion engineering development responsible for such high-speed heating is derived from the use of all-ceramic gas burners, utilizing accurately carbureted gas-air mixtures at higher than normal pressures.

The radiant burner, fig. 3, contains a burner tip in which there are a number (22 to 48) of accurately

sized, uniform ports. From these ports the gas-air mixture is discharged under pressure, and directed so that each small flame sweeps the surface of the burner cup cavity. The surface of the cup functions as a radiant surface with the degree of incandescence adjustable by the volume of air and gas passing through the burner ports. The entire construction of the burner is of ceramic material, with the exception of the parts external to the furnace casing. Incorporated in the design are features of mechanical flexibility involving springs and bellows, which assure perfect alignment of the burner elements even though the furnace wall is subject to thermal expansion and contraction.

In such burners it is possible to obtain large heat releases in small burner concavities, and, through use of the insulating and refractory qualities of ceramics, to obtain completion of the combustion reaction within the confines of the burner. This is a highly desirable feature, since no flame, as such, exists in the heating chamber beyond the face of the burner block, and consequently there is no flame to impinge on the charge, no matter how close the radiants are placed.

Efficiency of these furnace units is very high, because the turbulence set up by combustion of the gas produces the advantages of convective heat in addition to radiant heat, and thus assures rapid heat penetration into the charge.

The heating unit at B&W is completely automatically controlled. No personnel are specifically assigned to the operation of the furnace unit, although the sinking mill superintendent does, however, occasionally take a look at the control panel to satisfy himself that all is well.

As shown in figs. 1 and 4, there are 12 furnace units installed in series, covering an overall distance of about 60 ft. The furnaces are purposely built in short sections, with guide rolls installed between the furnaces, to minimize sagging of the tubes. An added precaution against sagging is brought into play by a slight offset of the rolls, so as to give a slight rotation to the tubes as they pass through the furnaces. It must be realized that the length of the workpieces—tubes 30 to 42 ft long—is such that one tube is passing through five or six furnaces simultaneously. The space-saving features of the furnace assembly appear even more impressive when it is considered that one workpiece occupies about half of the entire length of the installation at one time.

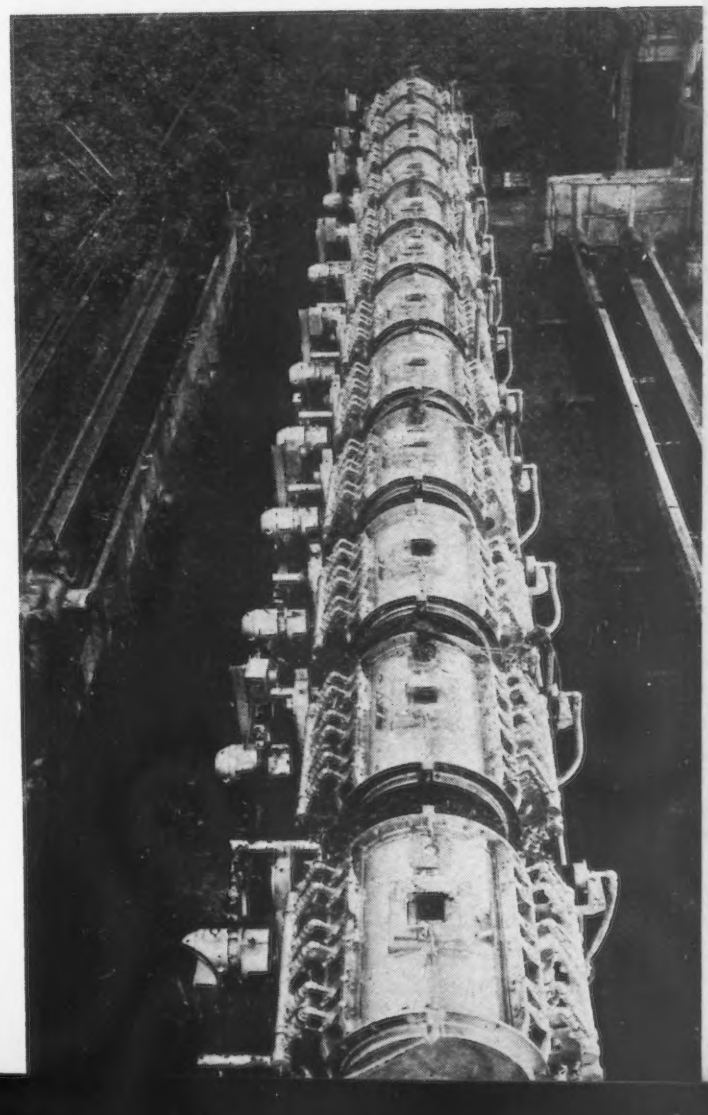
Temperature of the tubing passing through the furnaces is determined by means of radiation thermocouples, used in conjunction with Pyrotron potentiometer recorder-controllers, located ahead (about 5½ in.) of furnaces 1, 3, 5, 7, 9, 11 and 12. Each recorder-controller records the temperature measured and controls the heat dispensed in furnaces 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, 11, and 12, respectively, controlling the fuel rate to the furnaces by positioning butterfly regulating valves in the fuel lines. A final tube-temperature recorder is installed for measurement of the temperature of the tubes as they leave furnace 12 and enter the sinking mill.

In order to keep the fuel flow to the furnace (or furnaces) at a minimum when there is no tube passing through, equipment consisting of a photoelectric relay and light source, and a vacuum-tube time delay relay is brought into use. The photoelectric relays and light sources are so located to sight the tubing as it enters furnaces 1, 3, 5, 7, 9, 11 and 12. When a tube is passing through the furnace (or furnaces) the circuit is closed and a butterfly valve is open and is regulating. When there is no tube passing through, the circuit is broken and the regulating valve is at its minimum position.

For protection of the furnace walls, in view of the high temperatures obtained, furnace temperature limiting devices are installed and act on furnaces 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, 11 and 12, respectively. The limiting device is equipped with microswitches, set to trip at predetermined temperatures, known as the low limit switch, the medium limit switch and the high limit switch. When all of these switches are in contact, the control system operates unhampered or unchanged with regard to conditions.

When a predetermined high temperature (2600°F), which approaches the danger point with regard to the furnace wall, is reached, the low limit switch is tripped and opens, and the regulating valve goes to its minimum position. This cuts the fuel flow to the furnace (or furnaces) to a minimum. If the furnace wall temperature continues to go higher after the low limit switch has been tripped, at a second predetermined temperature (2750°F) the medium limit switch is tripped and opened. This causes a bypass air valve to open and allows air to be fed to the furnace along with the fuel. If the furnace wall temperature continues to go still higher after these two switches have been tripped, the high limit switch is tripped and opens at a third predetermined temperature (2850°F)

FIG. 4—Top view of Selas high-speed gas heating furnace assembly indicating relationship of the assembly to the final sizing mill. The sizing mill is located immediately behind the twelfth furnace unit.



and shuts off all fuel to the furnace (or furnaces). To date, there has been no occasion for use of the furnace temperature limiting device, although it is maintained as a standby emergency in case of failure of furnace controls.

A brief description of the heating operation will best serve to illustrate the manner in which the controls function. If for any reason the furnaces have been turned off, and this is rarely done, in view of the low cost for idling the units, about 1 hr is required to bring them to operating temperature. The furnaces then idle, controlled by the photoelectric relay and the radiation thermocouple, until the piercing mill starts to produce seamless tubing for the sinking mill.

As a tube is about to enter the first furnace, the photoelectric relay sights the tube and causes a butterfly control valve (controlling furnaces 1 and 2) to open and to regulate. The radiation thermocouple records the temperature of the entering tube, and since the tube is at about 1200° to 1400°F—much below the desired temperature—furnaces 1 and 2 are immediately stepped up to wide-open position, and

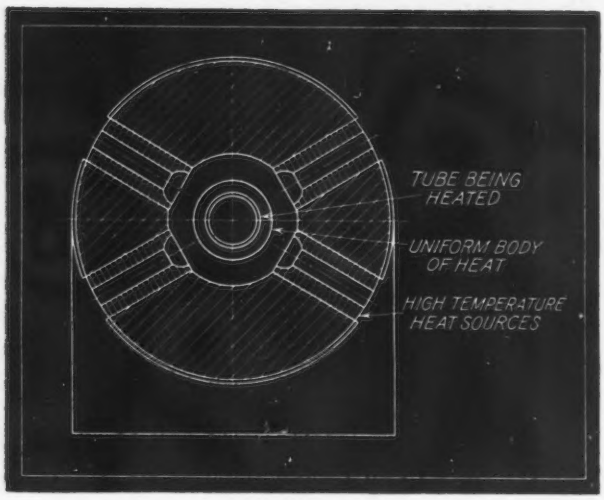


FIG. 5—Sketch shows the location of the heat units in a cylindrical heating chamber for the heating of a tubular charge. Within the heating zone the burners produce a high temperature, largely radiant body of heat, which is itself cylindrical in shape and which completely surrounds the charge. The arrangement permits a change of tube size without any change in the heating arrangement or the conveyer.

anticipate the heat-work to be done on the approaching tube. Hot gases can be seen to emerge through the furnace ports with almost instantaneous response. This procedure is then repeated as the tube progresses past the other photoelectric relay and radiation thermocouple stations, which arouse the same response in the furnace or furnaces each controls. Somewhere along the line (depending upon tube speed and type steel) the tube is brought up to desired temperature. From that point on, the furnaces do not open up but merely idle, sufficient to hold the tube at temperature.

In other words, if the tube comes up to desired temperature in the first six furnaces, the remaining six will cut back to down position. If it takes the first ten to get the tube up to heat, the remaining two will cut back, and so on.

Versatility of the furnace assembly is emphasized by the fact that a serious error in judgment can therefore be made in setting the tube speed, without affecting adversely the desired final tube temperature. This also allows a great deal of freedom in adjusting the speed of tube feed to prevent backing up of tube stock along the production line. As the end of a tube passes the various photoelectric relay stations, the furnaces cut back to idling position until opened up again by the tube following, and so on, in a continuous cycle. The flexibility of the furnace assembly is well illustrated by the manner in which it is used. Sometimes the installation is in continuous 24-hr operation, and at other times is used intermittently, depending upon production requirements. For the periods that the heating unit is being bypassed, it operates at idling conditions and is held in ready standby for use whenever required.

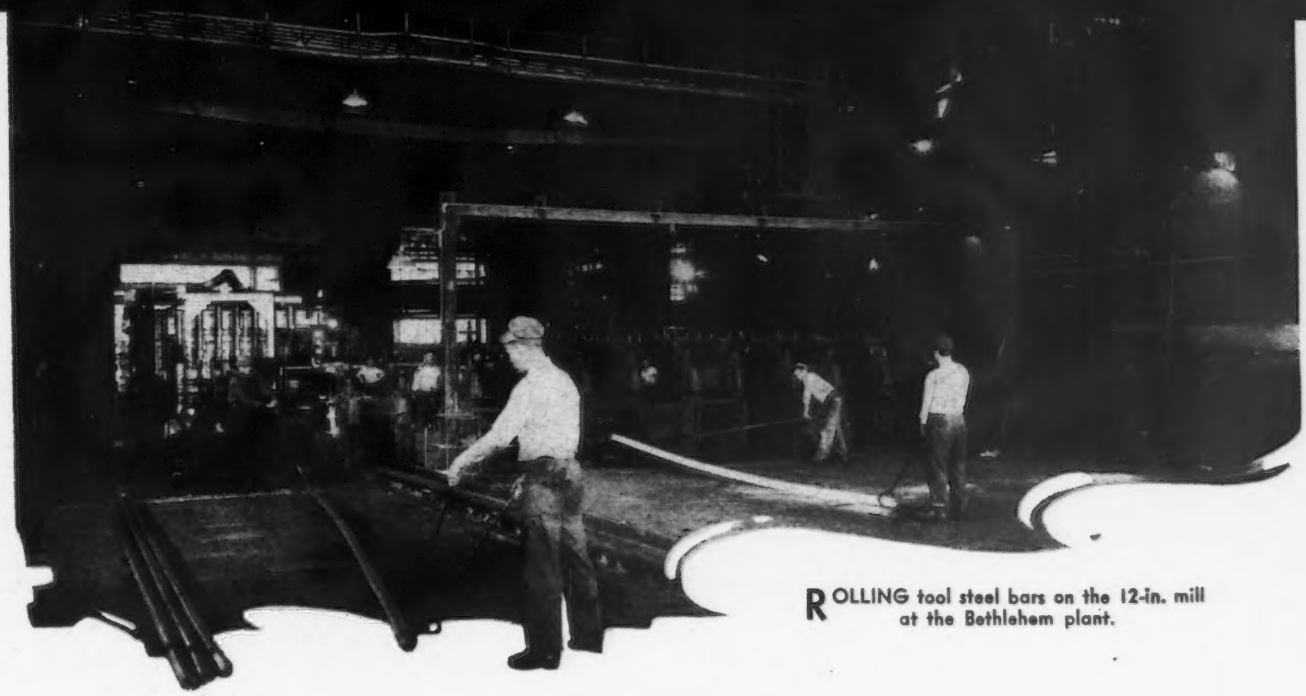
Various sizes of tubing can be passed through the heating units without any modifications in setup. The various types of steels used in producing seamless tubing require different temperatures for the sinking operation. Due to the wide range of diameters and wall thicknesses of tubing that must pass through the furnace, it was so designed that it would more or less automatically properly heat all the tubing. This is accomplished by the quick-reacting controls, and in going from the very lightest section to the heaviest section at a rate exceeding the designed tonnage rate of the furnace, it is necessary to change the setting of several of the final furnace units. Normally it is not necessary to change any of the settings, provided final tube temperature is to be the same. If there is a variation in final tube temperature, the necessary temperature adjustments are made in furnaces 11 and 12.

Maintenance costs of the Selas units are much lower than those of the heating furnace formerly used, not only from the standpoint of saving in manpower, but also in the simple manner in which repairs can be made. For example, each furnace is fired by four sets of burners, see fig. 5. Each set (containing six burners) is fed by an individual manifold, with a safety fire check, so that if any difficulties are encountered in any set, it can be turned off. If necessary, an entire furnace unit can be shut down with the remaining 11 furnaces in the line continuing in operation. Then, at such time when the assembly is idling, or turned off, the necessary repairs can be made. A spare furnace is kept on hand for possible replacement use.

There has been no occasion as yet to warrant a shut-down of the heating assembly although furnaces 1 and 2 will require a cleaning in the near future. As the tubing passes into these first two furnaces, the sudden heating up of the tube causes the scale on the outside surface to spall off, necessitating an occasional scale-removal treatment. The scale on the inside surface of the tubing, also flaked off, is blasted, by pressure in the furnace, from the rear end of the tube. This particular feature appears to be desirable in that the heavy scale formed during initial tube-forming operations is completely removed and replaced with a new, relatively thin scale. The short time at heat, about 1 min 12 sec for 6-in. tubing at minimum speed and about 24 sec at maximum rated speed, does not allow for the formation of a thick scale.

The new scale is such as not to interfere in any way with the sinking mill operation in producing tubing in accordance with size and surface specifications.

It might be assumed that tubing is exposed to the atmosphere during the heating cycle due to the spaces (about 7 in.) between each of the 12 furnaces. This is not the case, since the hot products of combustion from adjoining furnaces are of sufficient length as to merge and form a blanket over the tube surface.



ROLLING tool steel bars on the 12-in. mill at the Bethlehem plant.

Bethlehem Expands Tool Steel Facilities

By R. J. KNERR

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and

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Taking advantage of the many improvements that have been made in heat treatment and rolling and forging equipment and techniques, Bethlehem Steel Co. has completely reorganized its Bethlehem, Pa., tool steel production layout. This modernization program, which has served to improve tool steel quality and working conditions, increase capacity, and make for more efficient all-around operation, is described in this article.

AN extensive program of modernization and expansion, carried out over a period of nearly one year, has just been completed in the tool steel department at the Bethlehem, Pa., plant of Bethlehem Steel Co. The new equipment installed consists mainly of heating, controlled-cooling and heat-treatment facilities, and standard and special machines used in the various finishing operations.

Emphasis has been placed on modernization and improved layouts. New cranes and rolling equipment have been added, facilities have been mechanized, and equipment rearranged for more efficient operation. Improved working conditions and greater all-around safety are other advantages accruing from the better arrangement of the plant.

Fully aware of the great care required in maintaining internal soundness in the many tender, heat-sensitive types of tool steels, equipment has been provided for controlled cooling and inspection after every forging and rolling operation. All furnaces used for this purpose, as well as the heating and annealing furnaces, have been equipped for automatic control.

A mill depot, with storage space for tool steels and special steels has been erected, and the storage areas for billets, blooms and finished bars have been enlarged and improved.

All Bethlehem tool steels are made by the electric furnace process. One 25-ton and two 50-ton furnaces are used in the production of the lower-alloy steels and the carbon and carbon-vanadium grades. They are all machine-charged and equipped with automatic control devices.

High-speed steels, air-hardening steels, hot-work steels and similar grades are made in a 7-ton arc fur-

nace and a group of three 1000-lb induction furnaces. Two of these, with switch gear and four sets of capacitors, have just been installed. The top-charged, 7-ton furnace has been equipped with a modern hydraulic roof lift to speed up charging, and with an automatic, continuous electrode regulator to maintain the desired power input and to facilitate a better carbon control. A new 30-ton crane has also been installed in this shop.

The production from the 7-ton furnace is normally cast into square hot-top ingots, the cross-section of which ranges from 6 to 16 in. square, according to the size of the finished bar. Experience has proved that a 90 pct reduction in area from ingot to bar is the minimum required to reduce and distribute the carbides[1] which are characteristic of the high-tungsten and the high-carbon chromium steels. Two induction furnaces are generally tapped into one ladle and teemed into ingots ranging from 6 to 13 in. square, and weighing from 200 to 2000 lbs.

[1] *See "Effect of Forging on Segregation in High Speed Steel,"* THE IRON AGE, *Feb. 27, 1947, p. 43.*

The ingots from the 7-ton arc furnace and the induction furnaces are either cogged on a 6-ton hammer or rolled on a 16-in. hand mill with specially designed rolls.

The rolled billets in 2 or 2½-in. round sizes are control-cooled, annealed, inspected internally, straightened, rough-turned and returned to mills for rerolling into bars.

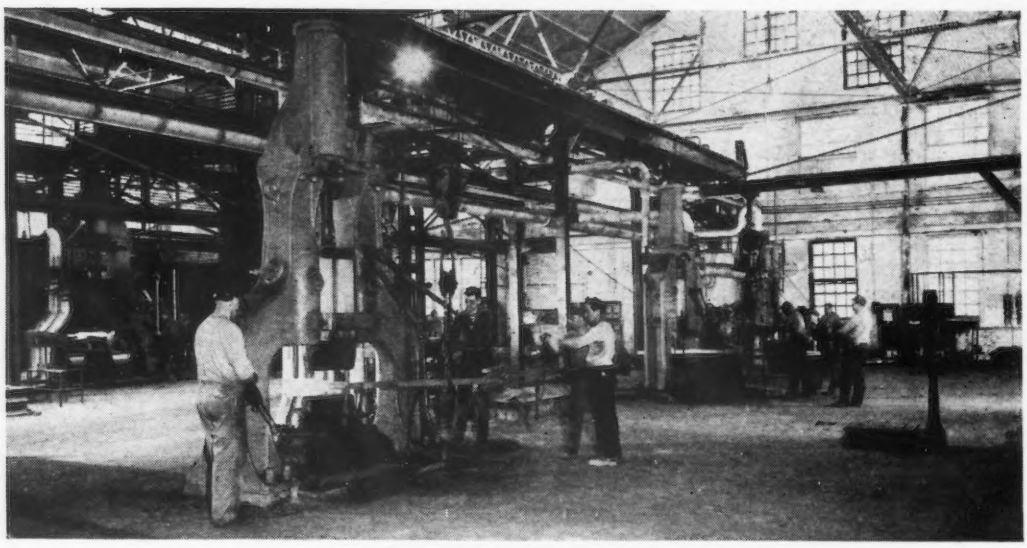
Hammer Forging

Immediately upon stripping, the hot ingots are charged into gas-fired preheating furnaces where they are held until the temperature is 1400° to 1650°F throughout their entire mass. Two furnaces were formerly used for this purpose, but now a third unit has been added to permit the greatest possible care in taking the ingots up to the required temperature.

After preheating, the ingots are transferred to a specially designed two-chamber, gas-fired furnace where they are slowly brought to the desired forging temperature, 2100° to 2300°F, depending upon the grade. They are then reduced to billet sizes on a 6-ton steam hammer equipped with a manipulator.

The resulting billets are buried in diatomaceous earth for slow cooling over a period of up to 100 hr. They are then placed in boxes and annealed at approximately 1400°F in a furnace with bung-type roof, equipped with pyrometer control and fired with combination oil-and-gas burners. For increased flexibility this furnace, which is 37 ft long, has removable bulkheads, making it possible to operate it as multiple units, if desired.

After cooling, the annealed billets are tested for internal defects by hot-acid etching. They are then ground to remove surface imperfections prior to further reduction to bar size on smaller hammers and in rolling mills. Some of the larger size billets may first be given an additional break-down in a 16-in. roughing mill, followed by controlled cooling, annealing and spot grinding. All grinding is carried out in special booths, under suction, making the operation virtually dust free.



o o o

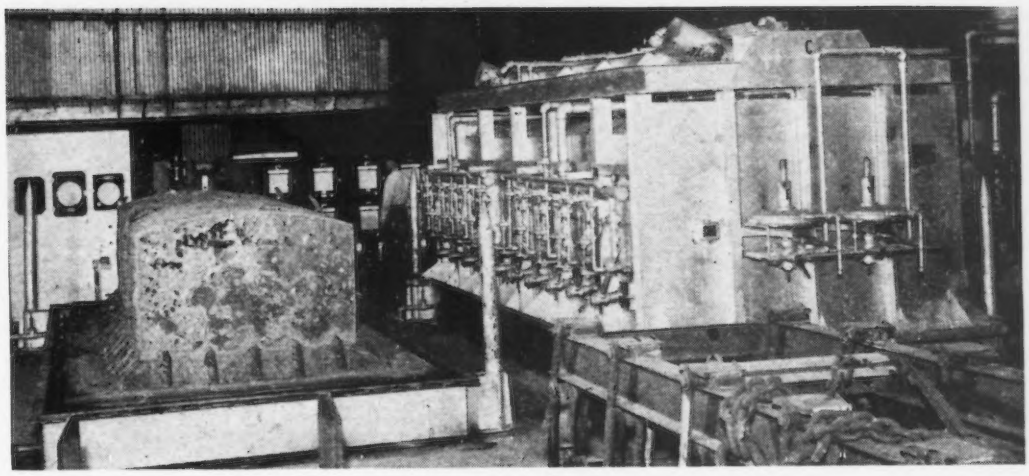
FORGING tool steel billets. Hammers used for this purpose range from 1000 to 4500-lb capacity.

o o o

Forging on Smaller Hammers

Four forging hammers, of 1000, 1500, 2500 and 4500 lb capacity, are available. The largest of these has just been equipped with a 3-ton manipulator and turntable and the 2500-lb hammer with overhead, crane-operated tongs, while the two smallest units are manually operated.

A number of other improvements have also been completed in this shop. All the former heating furnaces have been removed and replaced with the latest type furnaces designed to give maximum flexibility in the heating operations. These furnaces are all of the twin-chamber type, with steam-atomized oil firing, and are capable of heating 1 to 10 in. square billets from room temperature to 2300°F. Two of the furnaces have a rated capacity of 800 lb of steel per hr. the other two a capacity of 1000 lb per hr. They have insulated, arch-type roof and twin doors in each chamber and the firing is manually controlled, with a pyrometer in each chamber. The furnace pressure is controlled automatically. After forging, the bars are placed in boxes and covered with diatomaceous earth for slow cooling.



BELL type annealing furnaces for tool steel bars. The inner covers are of stainless steel. Note the construction of the apron of the inner bell.

Annealed and inspected billets from the 6-ton hammer or the 16-in. roughing mill may also be reduced to bar sizes on a 9-in. and a 12-in. hand mill. A large number of changes have also been completed in these mills.

The two mills operate side by side in the same mill building and are served by two heating furnaces each. One of these is a new continuous type, oil-fired unit. The other three are of the compartment-type and have been completely rebuilt and equipped for oil firing, with automatic regulation.

The continuous furnace which serves the 12-in. mill is of the suspended-roof type, with end charging and side discharge. It has a hearth 50 ft long, with steel skids the first few feet inside the charging door, and with six rows of silicon-carbide skids for the remainder of the distance. Billets up to 6¼ in. square, in lengths up to 7 ft, with a maximum weight of 1080 lbs, may be charged, with the shorter lengths arranged in double rows if desired.

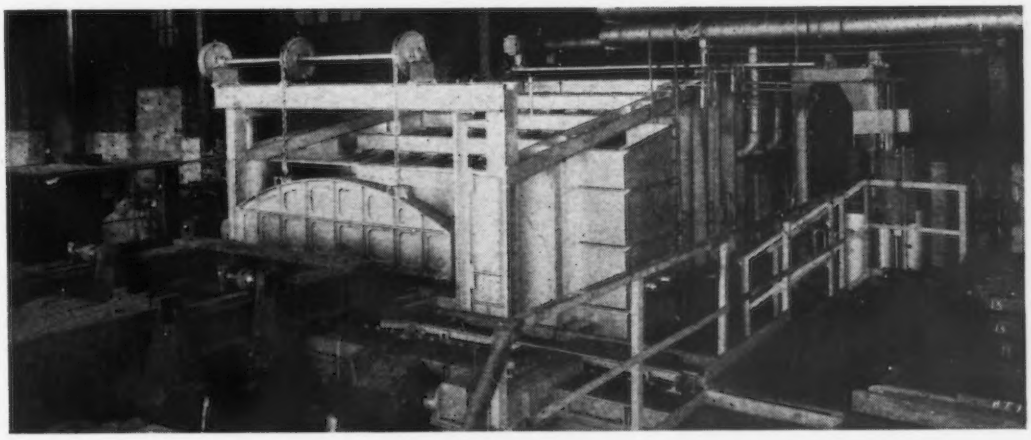
A movable-damper type knuckle which can be set to extend down to 7 in. from the hearth divides the furnace into a preheating zone where the cold billets are brought up to 1400°F, and a heating zone where the temperature is raised to 2150° to 2250°F, depending upon the grade of steel heated.

When heating cold tool steel billets up to 2150°F, the furnace is capable of handling up to 10 tons per hr., with a fuel consumption of 1.8 million Btu per hr. Six burners are arranged in the heating zone and three in each side wall in the preheating zone. Full automatic control of the temperature, furnace pressure, and air-fuel ratio is maintained in both zones. The three other heating furnaces, all oil fired, include a single chamber unit for the 9-in. mill, and two double chamber units of identical construction, one for each mill. A new 42-in. saw, with gage, cooling bed and runout table, has also been installed in the 12-in. mill.

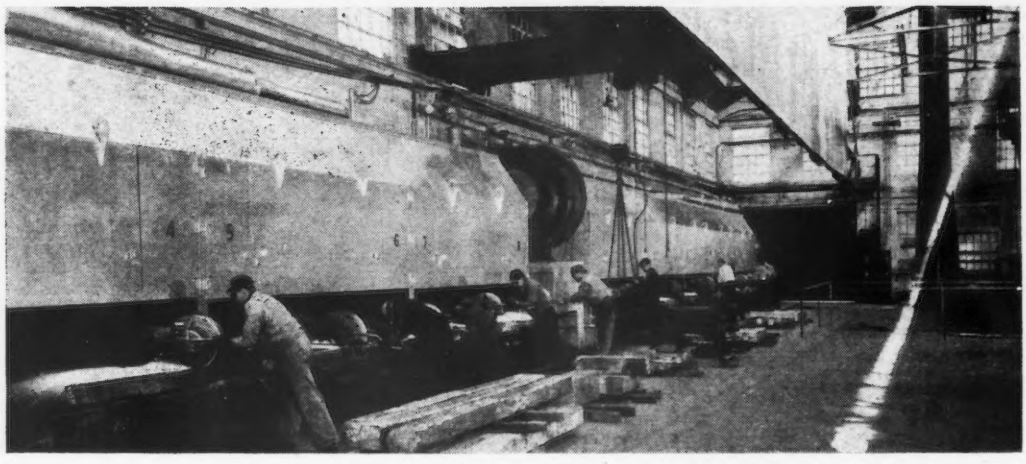
Extensive facilities for controlled cooling have also been added at the two mills. These include three electrically-heated holding furnaces and two large, oil-fired furnaces for controlled cooling.

The holding furnaces are used for storing the sheared bars coming from the cooling beds, prior to controlled cooling or annealing. They are insulated and equipped with covers and have heating elements arranged along the sides. Two double-chamber, bung-type furnaces are used for controlled cooling. These are 35 and 37-ft long and are fired with gas or oil and have pyrometer control in each chamber.

Before the forged or rolled bars can be further processed by cold working without danger or cracking, they must be thoroughly annealed and cooled slowly from above the critical range. This operation



CONTINUOUS heating furnace used in heating ingots and billets prior to rolling on the 12-in. mill.



GRINDING billets preparatory to rolling. Powerful suction fans keep the operation virtually dust free.

has a softening effect and it also serves to remove stresses and refine the grain structure.

All types of tool steels are somewhat subject to decarburization during annealing, and almost any type is susceptible to grain growth if the temperature is too high. Four bell-type furnaces with atmospheric control have been installed to overcome these tendencies. These furnaces are equipped with five bases and five stainless steel inner covers over the charge. A neutral atmosphere of nitrogen and propane is circulated under the covers during the annealing cycle. An airtight oil seal prevents infiltration of outside air or the products of combustion.

The furnaces are used for annealing high-speed and air-hardening steels produced on the hammers and the hand mills. They are capable of heating tool steel bars from room temperature up to 1680°F without surface decarburization. A maximum temperature variation of ± 5°F from one end of the charge to the other is allowed during the soaking and cooling cycle. The furnace capacity is five tons of bars, in lengths of from 10 to 13 ft.

Eight cradle assemblies made of alloy castings are used for loading the bars on the bases. Each cover is equipped with 20 burners operating on desulphurized gas. The furnaces have automatic temperature regulation and recording for controlling the annealing cycle.

The annealing cycles selected depend upon the composition of the steel and the customer's requirements. In the majority of cases a spheroidized structure is desired, since in tool steels such a structure offers minimum hardness combined with maximum machinability. In hypereutectoid steels it is also necessary to have the anneal break up the complex carbide network, which forms upon forging or rolling, to prevent brittleness in the hardened tool. In some cases a preliminary heat treatment consisting of either normalizing or oil quenching is used to ensure the production of a fully spheroidized structure in annealing.

Bars that have satisfactorily passed inspection are processed in the cold-finishing section. Here they are straightened, cut to length, rough turned, ground and polished, and identified for shipment. Each individual bar is spark tested prior to shipment.

Finishing Department

To facilitate final testing and inspection, all equipment used for this purpose has been located in a new building. This building also has a separate room for hot acid etch testing.

By relocating the testing equipment and providing additional storage for finished bars, much extra space has been made available in the finishing building. This has permitted a more efficient arrangement of the existing facilities in this building. Several new machines have also been installed, including four centerless grinders, two polishing machines, two bar-turning machines, and one large straightener for rounds up to 5-in. diam.

Formerly all ingot, billet, and bloom stock was kept in an outdoor storage space. This yard has now been fully enclosed, and extra space has been made available and placed under roof. Present enclosed storage areas include one yard 75x450 ft, one 60x300 ft, and one 80x120 ft.

Heats made in the 25 and 50-ton furnaces are cast in larger ingot molds than those used for the 7-ton arc furnace; most commonly used sizes are 15x18 in. (5200 lb), 17x20 (7200 lb), 22 in. and 27 in. corrugated (7800 and 13,000 lb).

With the great reduction in cross-sectional area ob-

A SECTION of the tool steel mill depot. Racks are loaded by means of a novel frame mounted on an electric truck.

tained in hot working these large ingots, a grain refinement is attained equaling that obtained in hot working the smaller ingots from the 7-ton furnace.

After stripping, the hot ingots are placed in heated, carefully controlled soaking pits where they remain, without firing, until their temperature is equal to that of the pit. They are then heated to the prescribed temperature, ranging between 1950° and 2300°F, depending upon their composition.

The uniformly heated ingots are placed on a roller line and taken to the 35-in. blooming mill for rolling into blooms and billets. Some steels are rolled directly into billets, but the more sensitive tool steel grades require a reheating operation during the breakdown.

Upon completion of rolling, discards and crops are taken, representing top and bottom of the ingot. Test samples are also cut from the billets representing top, center, and bottom section of the ingots. These are tested for chemical composition, grain size, and hardenability.

All billets are hot stamped with heat number, and the billets representing the top, which later are to be tested by hot acid etching, are also identified by ingot number. The hot acid etch test is most widely used as an aid in manufacturing control, rather than as an acceptance test, and is therefore usually applied to blooms and billets rather than to small bars.

After the billets have cooled to room temperature and have passed the acid etch test they are inspected for surface defects and conditioned by grinding. They are then either rolled or hammered to finished sizes within standard tool-steel tolerances. The subsequent treatment, including controlled cooling, holding, and annealing, as well as the various finishing operations, follows the outline given for the output from the smaller furnaces. The majority of the production from the larger electric arc furnaces is annealed and processed in equipment of the latest design located in the Special Steels Dept. of the Lehigh Div.

Tool Steel Mill Depot

Prompt and efficient delivery is an important consideration in the tool steel business. The new mill depot erected at the Bethlehem plant is designed to speed up deliveries to distributors, jobbers, and mill customers. Rapid, dependable service will also allow these to keep their own stock at a minimum and replace suddenly depleted sizes on short notice. Standard grades and sizes of tool steels are handled through the depot, and odd grades and sizes will be shipped directly from the mills.

Storage space is provided for tool steel in standard 10 to 12-ft lengths, and special 18 to 20-ft lengths. All grades are lacquered and painted in colors for ready identification, and record is kept of heat number and chemical analysis for all grades.

The new depot is a one-story steel and brick structure with 60x360 ft floor space, of which an area 200 ft long is actual storage space, 100 ft shipping floor, and 60 ft offices and welfare rooms.

Horizontal steel racks, with 3400 compartments, provide storage space for the many grades and sizes kept in stock. The bars are handled on two specially designed battery-operated buggies equipped with a loading mechanism including catwalk and roller lines which permits the operator to place the bars in or remove them from the compartments at all levels. A 10-ton overhead crane serves the storage area and the shipping floor.

. . . NEW BOOKS . . .

"Proceedings of the American Electroplaters' Society —33rd Annual Technical Sessions." Review of June 1946 session of the Society has been compiled for the metal finishing industry. Subjects covered include electropolishing, disposing of plating room waste liquors, electrotinning, surface preparation, organic finishes, stripping of copper, determination of impurities in electroplating solutions, methods for testing thickness of electrodeposits, and Manodyzing and dye coloring of magnesium alloys. American Electroplaters' Society, Box 168, Jenkintown, Pa. 304 p. $6.50.

* * *

"Radiography in Modern Industry." This book is intended to provide a dependable text of the fundamental knowledge necessary for efficient radiographic practice. Great care has been taken in arranging its contents to meet the need of the serious professional worker as well as the student reader. Eastman Kodak Co., Rochester 4, N. Y. 122 p. $3.00.

* * *

"Finishes For Aluminum." This work has been compiled to offer an up-to-date review of the many advances in the aluminum finishing field. Section one is devoted to 8 cleaning treatments, 17 mechanical surface finishes, 15 chemical surface finishes, 11 electrolytic oxide treatments, 12 electroplated coatings (vitreous enamels), special finishes such as silk screen and sprayed metal finishes, and concludes with a discussion of various controls and tests for finishes. Section two supplements this information with shop data on materials, equipment solution preparation, procedure and control. Reynolds Metals Co., Dept 27, 2500 So. Third St., Louisville 1, Ky. $2.00.

* * *

"Welding Symbols," by Vincent C. Gourley. A comprehensive guide to the uses and meanings of the various symbols used in arc, gas and resistance welding. Profusely illustrated, the book considers each standard symbol by means of a specific example as given on a drawing, and shows pictorially the exact location and outline of the welds corresponding to this symbol. Bruce Publishing Co., 540 N. Milwaukee St., Milwaukee. 115 p. $2.50.

* * *

"The Foreman in Manpower Management," by Lillian M. Gilbreth and Alice Rice Cook. This book stresses the importance of the human factor in today's dealings between employees and representatives of management. Selection, placement, training, promotion, transfer and dismissal of the worker are discussed as well as foreman-employee relationships. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. 199 p., $2.50.

Heat Treatment of Some

Effects of heat treatment on the physical properties of some chromium-nickel alloys, including 18-8 stainless steel, are indicated in this article, wherein the various alloys are reviewed in a correlated, overall study. Considering the materials as sheets and tubes, the author calls attention to the behavior of some of the alloys during their conversion into parts or structures and under service conditions. Various precautions that must be observed in heat treating these alloys are also emphasized.

TO speak of the heat treatment of 18 Cr-8 Ni and other related alloys in only general terms may expose one to liability for error in the prediction of operating results, since the effects of heat depend upon the prior history of the heated part and where and how, in the total life of the part, the heat is applied. Heating and cooling operations are applied by the steelmaker and by the fabricator or parts manufacturer. Heat is applied later to parts in service at elevated temperatures, under (or without) mechanical load and possibly in environments other than standard atmospheric.

This discussion assumes the use of sheets and tubes. Brief mention is made of behavior in some kinds of service—steel production itself is neglected.

Representative chromium-nickel alloys are: Types 302, 304, 308, 309, 310, 316, 321 and 347; including some high temperature alloys, Inconel, Hastelloy C, 19-9 DL, 16-25-6 and S-588. Some commonly specified heat treatments (also denoted thermal treatments) are outlined in tables I, II and III. For the austenitic chromium-nickel stainless steels, heat is usually used to dissolve carbides, to produce maximum ductility, to relieve internal stress and to stabilize the material. Stabilization is used to obtain maximum resistance to corrosion and also where a final heat treatment is impossible or impractical. In some of the other high temperature alloys, heat is used to obtain maximum-valued mechanical properties or other values of mechanical properties that may be desired for a specific service. Heat is also required for welding.

For other articles discussing heat treatment of 18-8 *stainless steel, see* THE IRON AGE, *May* 30, 1946, *p.* 46, *"Heat Treatment of Stainless Steel"; Aug.* 8, 1946, *p.* 61, *"Behavior of* 18-8 *Ti-Stabilized Stainless," Part I; Aug.* 15, 1946, *p.* 54, *"Behavior of* 18-8 *Ti-Stabilized Stainless," Part II.*

Because of the values of material and labor involved, in addition to the value of the end product, reasonable but specific care is called for, that what may appear to be minor details are not allowed to render

TABLE I

Thermal Treatments for Austenitic Chromium Nickel Steels[17]

Alloy Type No.	Solution (Anneal), °F	Stress Relieve, °F	Stabilize, °F
302	1850°–2050° (cool rapidly)	400°–750°	.....
304	1850°–2050°	400°–750°	.....
308	1850°–2050°	400°–750°	.....
309	1900°–2050°	400°–750°	.....
310	1900°–2100°	400°–750°	.....
316	1850°–2050°	400°–750°	.....
321	1750°–1950°	400°–750°	1550°–1650°
347	1850°–2050°	400°–750°	1550°–1650°

Note: Solution treatment is usually applied to dissolve carbides and to produce maximum ductility. Stress relief treatment is usually applied for relief of internal stresses. Stabilization treatment may be applied to obtain maximum resistance to corrosion in grades 321 and 347.

TABLE II

Heat Treatments for 18-8 Cr-Ni Alloys—A Comparison from Various Sources

Specifying Agency	Solution (Anneal), °F	Stress Relieve, °F	Stabilize, °F
Producers' Bulletins:			
A	1850°–2000° (15–30 min)	.....	.....
B	1900°–2050°	.....	.....
C	1800°–2100°, WQ	.....	.....
D	1850°–2000°	.....	1800°, 30 min*
E	1900°–2050°	.....	1550°–1650°, 2 hr
Book of Stainless Steels	1800°–2150°	.....	1560°, 2–4 hr
Alloys of Iron and Chromium, Vol. II	above 1850°	.....	1550°–1900°
USN Bu Aero Spec. SR-43	.....	1575°–1625° 30–60 min	.....
Spec AN-QQ-H-201	1900°–2100° 30 min	1600°–1700° 30 min	.....

* Based on War Emergency Analysis for type 321 alloy.

Chromium-Nickel Alloys

By H. A. CAMPBELL
La Jolla, Calif.

the workpiece unusable. Before heat treatment, work should be cleaned free from oil, grease, or other carbon-bearing substances. If the piece has been formed by tools or dies containing zinc, the zinc traces should be removed completely to avoid subsequent cracking of the alloy. A heating furnace is more reliable and can be more economically operated if equipped with automatic temperature control. The furnace atmosphere should provide the best balance between weight loss of metal (as scale) and the cost of descaling. If minimum dimensional or geometrical distortion of the part is important, the rate of heating and cooling may be controlled or special work-holding fixtures may be needed.

Parts coated with oil, grease, or other substance that burns to carbon in a furnace may take on dangerously high local carbon contents. Often workpieces are marked in some way with inks or pencils. These markings may be in some cases sources of additional carbon. The markings therefore should be removed before heat treatment, unless the service required from the part makes removal unnecessary. In acid descaling baths, high local carbon concentrations will often show up as black patches or etching on the surface. In pack carburizing studies on 30 alloys, using 72 hr exposure at 1600°F, only eight alloys remained ductile enough to withstand a 180° flat bend test without failure. Among the eight alloys were samples of: 18.8 with 0.030 pct C, grades 321 and 347, and 18-8 containing columbium and silicon. These studies rather dramatically confirmed that carbon influences the ductility of the austenitic stainless alloys.

Among the marking materials that have been used successfully, removable in either vapor phase or alkali cleaning baths, are the following:

Stamp-pad inks:	"Mun-Kee" green, purple (Bates) 411½ red (Carter)	
Pencils:	No. 551 blue No. 553 green No. 561 red	(Blaisdell)
Layout lacquer:	methyl violet dye white shellac, thin as possible alcohol	mix thoroughly

Zinc-containing particles from tools and dies are readily removable in acid baths.

In the heat-treating furnace, the gas atmosphere influences scaling (and loss of metal) of the work. The influence of carbon monoxide and oxygen in one such atmosphere on the scaling of an 18-8 alloy, is indicated in fig. 1. Evidently, in this atmosphere when free from sulfur dioxide, reducing conditions favor minimum scale formation. In practice, a burned natural gas atmosphere, for which the flue-gas analysis showed 2.0 to 2.5 pct CO on "high" fire and 1 pct CO on "low" fire, provided satisfactory results although other atmospheres could be obtained with the furnace equipment available. These furnaces were operated at a control temperature of 1950°F. The scale formed was dark gray to brown in color and

FIG. 1—Curves showing effect of carbon monoxide, oxygen and sulfur dioxide on the scaling of 18-8 stainless steel at 1830°F. Atmosphere composition; 10 pct CO_2, 10 pct H_2O, 80 pct N_2.[18]

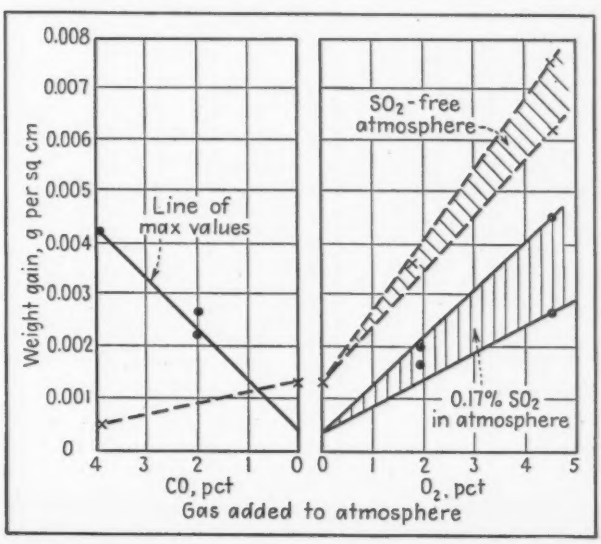


TABLE III

Selected Heat-Treatments for High Temperature Alloys in Table I *

Alloy	Solution, °F	Harden, °F	Stabilize, °F
Inconel	1800°-2000°		
Hastelloy C	2200°-2225° (2-3 hr)	1575°-1600° (8 hr)	2050°-2075° (2-4 hr)
19-9-DL	2100°		1650°
16-25-6	2150°, WQ	1200°-1500°, **	
S-588	2250°, WQ	1400°-1450° (8 hr)	

* Source of data; Literature of Producers.
** Hardness varies with time for any given temperature.

tenacious when cold. Some 20 to 25 pct of the outside scale layers chipped off during cooling of the workpieces.

Where parts to be treated are of small size or section, e.g. tubing, strip, or wire, a continuous or roller-hearth furnace having a cooling chamber and enclosing a protective controlled atmosphere may be economically appropriate. However, water vapor and oxygen, especially, must be kept out of the controlled atmosphere. Commercial apparatus is available for this purpose and the essential considerations are discussed in detail in the literature.[1, 2] Usually dry hydrogen or ammonia is most used for atmospheres for bright annealing or copper brazing. The difficulty of excluding oxygen increases with the size of the furnace.

Several years ago a roller-hearth electric furnace with a working cross-section approximately 3 ft wide by 2 ft high was applied to annealing of types 321 and 347 steel sheet stampings in 200 to 300 lb batch loads at a control temperature of 1950°F. The atmosphere generator, used without refrigerator or dryer, produced gas of the following analysis range: 11 to 7 pct CO, 4.7 to 7 pct CO_2, 16 to 9 pct H_2, and 2 to 0.1 pct CH_4—dew-point 85°F max. This atmosphere produced a thin, tightly-adherent oxide film (without flakes) on the work, initially dull gray in color. The color deepened to dark green if the work stood for several days before film removal. It was found impractical to attempt spot-welding these pieces before film removal, so that the acid bath removal process had to be continued in operation. Better results probably would have been obtained with a dried and refrigerated atmosphere. However, the use of this furnace did reduce descaling costs slightly and permitted treatment of a number of alloys different from 18-8.

TABLE IV

Results of Bend Tests

Alloy	As Received+ 1600°F, 72 hr, AC	1975°F, 10 min, AC +1600°F, 72 hr, AC	2150°F 10 min, WQ +1600°F, 72 hr, AC
304(s)	OK	OK	OK
309	180°	180°	OK
310	180° SI	180° SI	180° SI
316	OK	OK	OK
321	OK	OK	OK
347	OK	OK	OK
Inconel	OK	OK	OK
19-9-DL	180°	180°	180° SI

Terminology: OK = No cracking when bent through 180° and flattened on self. Angle = Approximate amount of bend required for continuous cracking. SI = Slight discontinuous cracking. AC = Air cooled. WQ = Water quenched.

Specimens: ¾x2x(0.045 —0.065) in. All were filed longitudinally and beveled on edges before bending.

All bends were OK on specimens in "as-received" condition. All bends were OK on specimens subjected to 1975° and 2150° treatments only.

Salt bath furnaces may be used where the salt films remaining on the work can be removed economically.[3,4] But where lap-joints or pockets occur in the workpieces, it has been found impractical or uneconomical in some cases to remove the salt deposits formed in these places. Possible reactions between molten salts and the work need to be considered also, in this type of process. Where salt deposits and surface reactions are of no consequence to the service life of the part or to its subsequent processing, salt baths may be among the most economical of methods to use.

Removal of scale and oxide films may be accomplished in hot or cold acid baths or by a molten salt bath such as the sodium hydride process.[5] Which method to use seems to depend upon the economics and production volume of any given shop. Acid baths seem to be most used and have been described in detail in the literature together with control methods,[3,4,6] (example, U. S. Patent 2,337,062). Sandblasting also has been used, but may damage thin sheet parts beyond use, if not handled with great care.

In addition to heat treatment in furnaces, welding processes may also be considered as a form of heat treatment operative locally on the work. Welding techniques have been described in detail in the literature.[7,8,9,10] Cross-sections of welds in austenitic alloys, under the microscope, resemble cast structures. The mechanical properties of weld filler-metal deposits have been found comparable generally to those of steel castings. Ideas of the extent of the heat-affected zone in welds may be had from such data as are to be found elsewhere.[11] The properties of the steel immediately adjacent the weld have been found to be usually the properties of annealed material (this may not hold, of course, for all of the materials), which factor must be taken into account when comparing the welded design with the service conditions to be met. For some of the high temperature alloys referred to at the beginning of this article, the properties of welds made under average shop conditions should be verified by tests before the design is frozen. The heat effect from a welding operation also might be regarded as a "gradient" heat treatment, with structure and properties varying from those of a casting in the filler deposit, outward, to those of the original wrought structure.

Residual stresses require consideration. In some cases peening may be used for stress-relief and even to cold work the heat-affected zone for improvement of tensile strength. The necessity for doing so depends upon the service expected from the finished part. Micro-Vickers or Knoop-Peters hardness-measuring instruments have been found useful for exploring phenomena of the heat-affected zone, and studies made with them may reveal much detail concerning the zone width and the steepness of the gradient.

The effects of heat upon some short-time tensile properties of chromium-nickel stainless steel are indicated in figs. 2, 3 and 4. Ductility particularly would seem to be affected. This is explained on the basis of carbide precipitation in the temperature range 1000° to 1500°F. In corrosion applications where the stabilizing heat treatment indicated in the tables is used, it should also be considered whether or not the resulting mechanical properties will be suitable for the service intended. Some results of an examination of ductility, conducted by means of the flat bend test, are given in table IV. The results for grades 309, 310, and 19-9DL showed most change following heat treatment. Such data as these may be useful in examining the problem of distortion. The alloys are high-expansion alloys, and it becomes easy to see from the data pre-

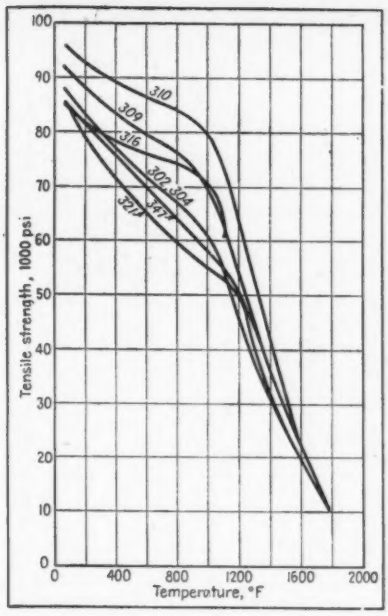


FIG. 2—Short time high temperature strengths of some austenitic stainless steels.[19]

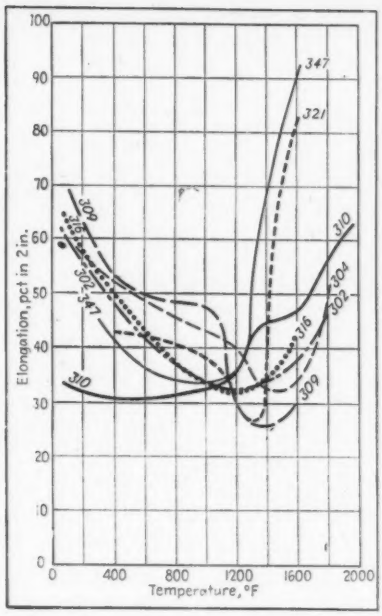


FIG. 3—Effect of temperature on elongation of some austenitic stainless steels.[19, 20]

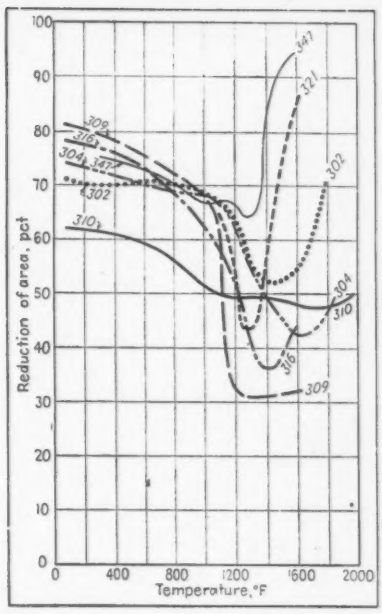


FIG. 4—Effect of temperature on reduction of area of some austenitic stainless steels.[19, 20]

sented how the possibility may arise of cracking or permanent deformation in the furnace, especially in an assembly under restraint.

The influence of the heat treatments used for the bend specimens on microstructures for three of the alloys is shown in Figs. 5, 6 and 7, for grades 321, 347 and 19-9DL respectively. It would appear from these micrographs that the same type of effect takes place in each of the three alloys. Additional information appears in the literature for grades 309 and 310.[12]

Heat applied by conditions of service also influences the properties of the alloys. Constantly recurring cycles of heating, cooling and change of stress value produce measurable variations in properties. Cyclic service conditions are found in exhaust pipes on aircraft and automotive engines and in the parts of gas turbines. In these applications operating temperatures may at times attain values up to 1750°F.

In rocket combustion chambers the metal is heated quite rapidly and runs at high temperature for a few

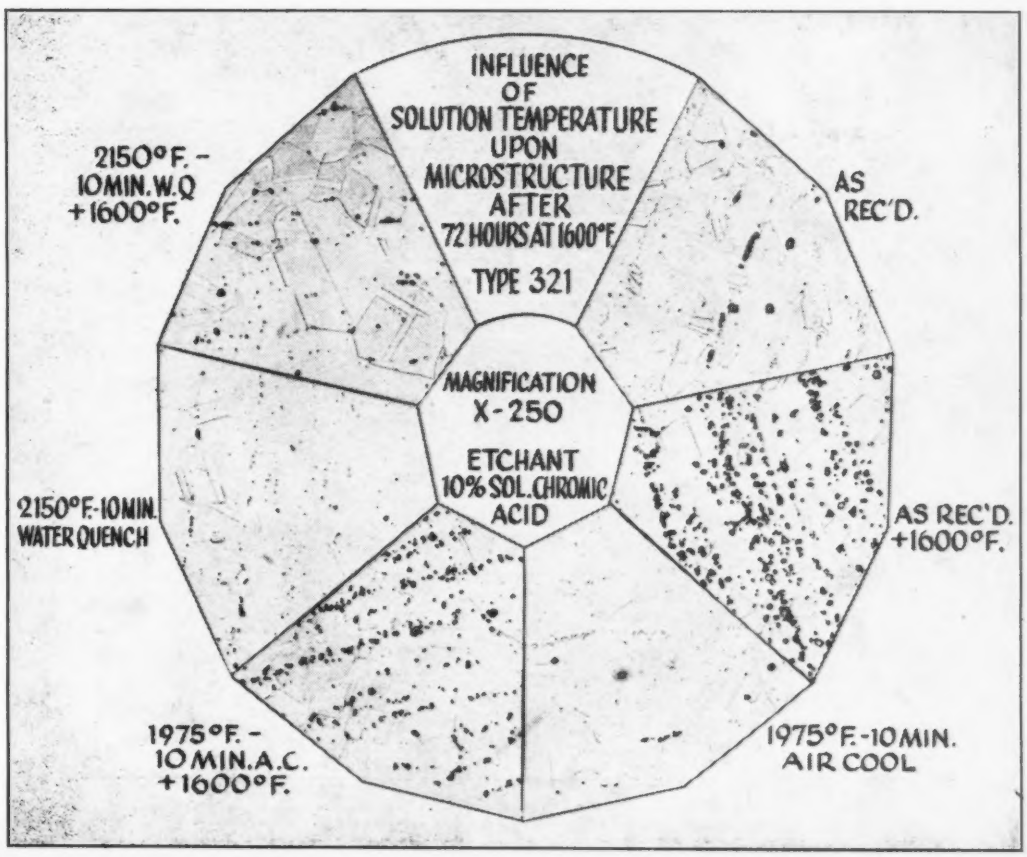

INFLUENCE OF SOLUTION TEMPERATURE UPON MICROSTRUCTURE AFTER 72 HOURS AT 1600°F
TYPE 321
MAGNIFICATION X-250
ETCHANT 10% SOL. CHROMIC ACID
2150°F. - 10 MIN. W.Q + 1600°F.
AS REC'D.
2150°F. - 10 MIN. WATER QUENCH
AS REC'D. + 1600°F.
1975°F. - 10 MIN. A.C. + 1600°F.
1975°F. - 10 MIN. AIR COOL

FIG. 5—Microstructures of type 321 alloy in the bend tests listed in table IV.—Courtesy Solar Aircraft Co.

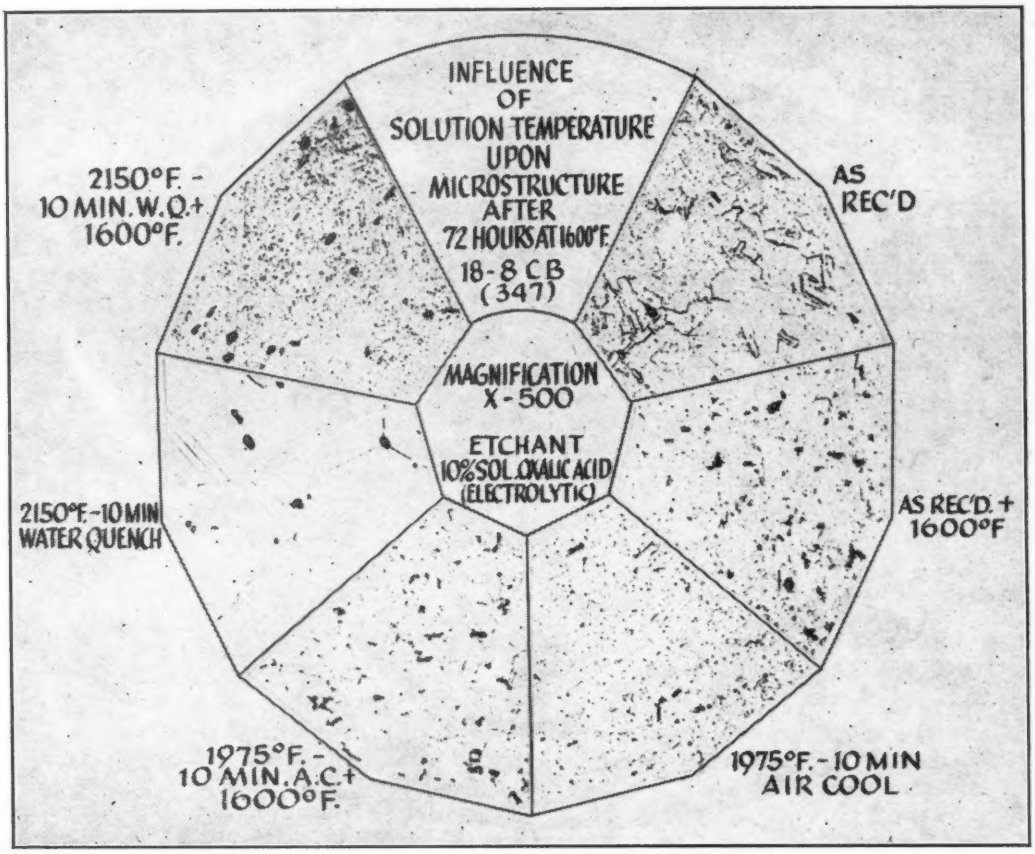


FIG. 6—Microstructures of type 347 alloy in the bend tests listed in table IV.—Courtesy Solar Aircraft Co.

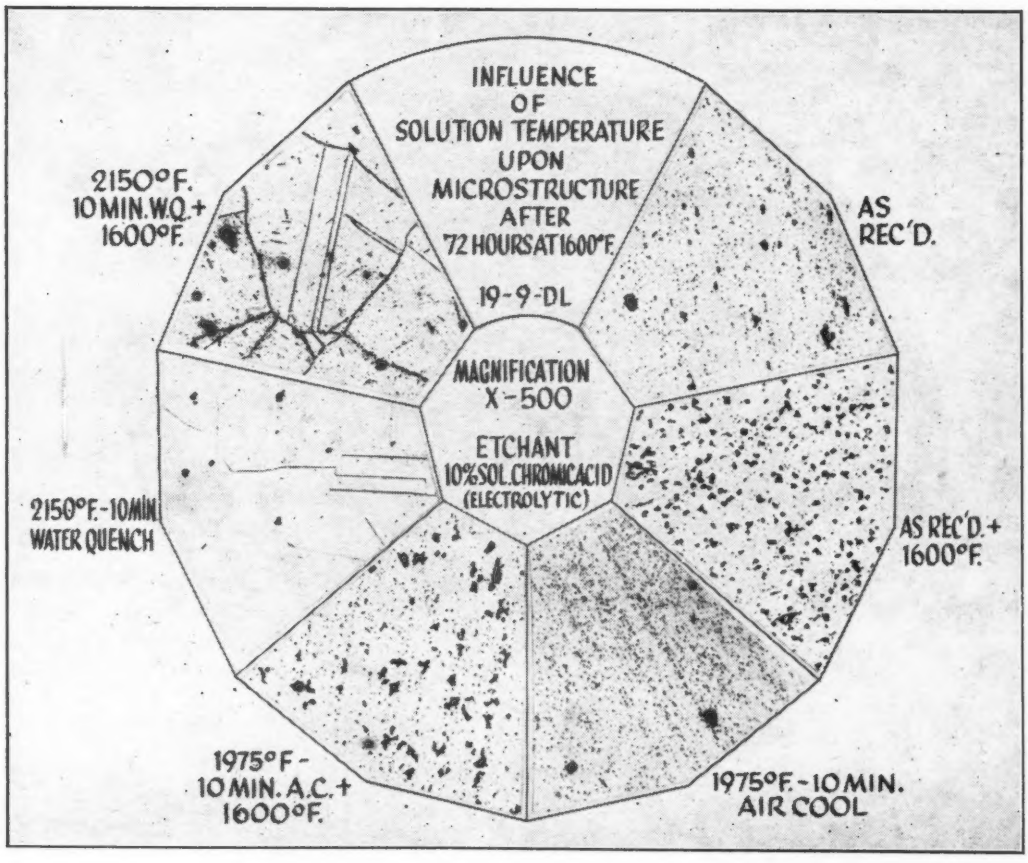


FIG. 7—Microstructures of 19-9 DL alloy in the bend tests listed in table IV.—Courtesy Solar Aircraft Co.

minutes. It seems reasonable to believe that different design values for mechanical properties would be appropriate between these classes of service, since the expected operational lives vary by a large ratio, on the order of 30,000:1. Petroleum product refineries have high temperature services,[13-16] extended over longer periods of time, in which creep strength values are of primary interest rather than short-time properties.

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[19] "Tables of Data of Wrought Corrosion-Resisting and Heat-Resisting Chromium and Chromium-Nickel Steels," ASTM, December 1942.

[20] Babcock & Wilcox Bulletin 6-D.

Flexible Multi-Transformer Welder Boosts Steel Drawer Output

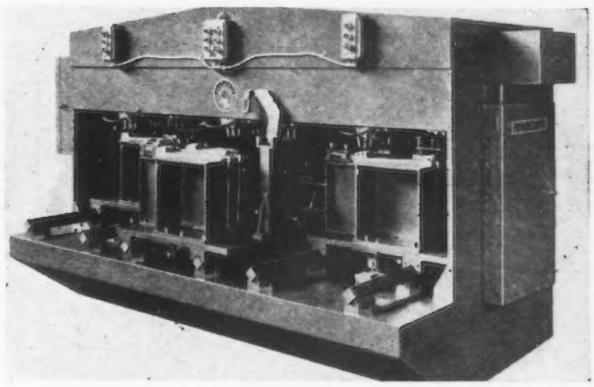

FIG. 1—This automatic Progressive multi-transformer welder can turn out 300 steel drawers per hr, 100 each of three different sizes.

WITH the tremendous development recently in the way of automatic multiple spotwelding machines, a type used quite a few years ago has also made a new bid for prominence—the multi-transformer welder.

In this type of machine, small individual transformers are used for each weld or pair of welds. Advantages of this arrangement are that greater variation can be incorporated if desired in the weld characteristics and that the machine may be easily reworked in case of model or design changes, by relocating the guns and their transformers, or adding or removing standardized gun and transformer assemblies as needed.

A recent new development in multi-transformer machines is shown in fig. 1. The machine, built by Progressive Welder Co., 3050 E. Outer Drive, Detroit, is designed to produce some 300 steel drawers per hr, the operation consisting of joining the drawer front to the body of the drawer and adding a stop clip to the bottom. A total of 12 welds is required for each drawer.

The machine has three separate units, performing identical operations on three sizes of drawers. Each unit has six 14 kva transformers, each transformer taking care of two welds in series, thus permitting extremely rapid welding. Depending on power available, all guns in one unit can weld simultaneously; or half of the guns can weld simultaneously, followed immediatey by the other half; or guns can weld in pairs, one pair after another.

In operation, the operator loads the drawer parts in place on the fixture and pushes a button. Automatic air clamps hold the parts in place. An air cylinder then automatically rolls the fixture into welding position. All guns come down together under hydraulic welding pressure. Welding current goes on automatically. When welding cycle is completed, guns raise automatically, and the fixture rolls out into loading position. Machine control is through an automatic sequencing panel.

Each of the three welding units is independent of the other two. Use of two operators is not essential except when production is sufficiently high to warrant use of machine to maximum capacity. However, the welder can actually produce drawers faster than a single operator could conveniently keep loading it.

How to Use Carbide Cutters for Milling

. . . *Analyzing the Workpiece*

. . . *Establishing Feed Rates*

. . . *Checking Chip Load*

Discussing further the planning of carbide milling operations, the author points out in this, the 14th article of this series, the necessity for carefully analyzing the workpiece for its metal removal possibilities. He also shows how the feed rate should be established for minimum operation time, and indicates how chip loads should be checked before putting a job into production. Specific examples are worked out, and the merits of climb milling are discussed.

° ° °

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° ° °

THE cutter having been selected as to size, suitability and cutting efficiency, it is now possible to proceed to the determination of the metal removal rate as justified by the component and its holdability. This determination takes into account the ability of the component to take the beating to which it is subjected while the cutting forces are applied to it.

The determination must be made in conjunction with the holdability of the piece, that is, the facility and effectiveness of its being held while the cut is taken. Either the workpiece is strapped to the table of the machine, or it is placed in a fixture that mechanically, magnetically, pneumatically, or hydraulically locates and holds the workpiece rigidly and securely in position for the cutting operation. Clamping always causes more or less distortion in the component, and when the forces are released after the metal removal has taken place the accuracy will be affected. Today, tolerances for accuracy and surface finish are being made more and more rigid and demanding. Hence the need to analyze carefully the effect of the workpiece construction and its method of holding, on the specified tolerances, after the indicated metal has been removed.

To this must be added the effect of vibration resulting from the machine itself and due frequently to the positioning of the spindle in relation to other supporting members of the machine tool. Thus, the skinning of the billet in fig. 71 represents what is referred to as a close hook-up, that is, the relation of the spindle, table and workpiece is suited for a vibration-free cut. The distance from the column to the table is at a minimum, as also is the distance from the workpiece to both the table and the column. This job can be done on a hogging-off basis; the metal can be removed in generous quantities and the surface condition and accuracy, if desired, can be held closely.

On the other hand, fig. 72 represents a common problem in the machining of relatively large machine tool components. This workpiece is mounted on the bed of a planer-type machine. When its lower portions are being machined, the relationship of the crossrail, bed and columns is entirely satisfactory. When the upper reaches of the job are being milled, however, the forces acting on the crossrail, if any sizable cut is being taken, will tend to distort and, finally, vibrate the machine members. The effect on cutter life and the tolerance specifications then become of prime importance. This is particularly true of the former factor, life. This important item in the total overall cost of the job is affected adversely almost as the square of the vibration increases. Whereas 40,000 to 50,000 sq in. of cast iron can be milled with satisfactory holding of the job, and when the job itself has ample sectional areas, this drops to 10,000 and less if vibration is noticeable and excessive. Sometimes its effect on tolerances can be overlooked, according to the specifications, but the uneconomical operation of a cutter and its effect on the downtime of the machine is an important factor in the cost of the job.

The answer to the question of how much metal can be removed from a workpiece obviously lies in the

workpiece itself. A small valve body, or an exhaust manifold for an automobile will require the application of metal removal rates in the neighborhood of 5 to 10 cu in. per min. But a piece such as is presented in fig. 71, mounted on the table of a 25 hp machine can be subjected to a removal rate of 100 cu in. and up, if the power is available. In fact, this operation is performed at the rate of 2 cu in. per min per horsepower and hence 50 cu in. per min total. A similar operation on a 50 hp machine permitted the conversion of an SAE 1020 steel billet into chips at the rate of over 100 cu in. per min without signs of distress in the machine, the workpiece or the cutter, and without, therefore, any lessening of surface condition or accuracy tolerances.

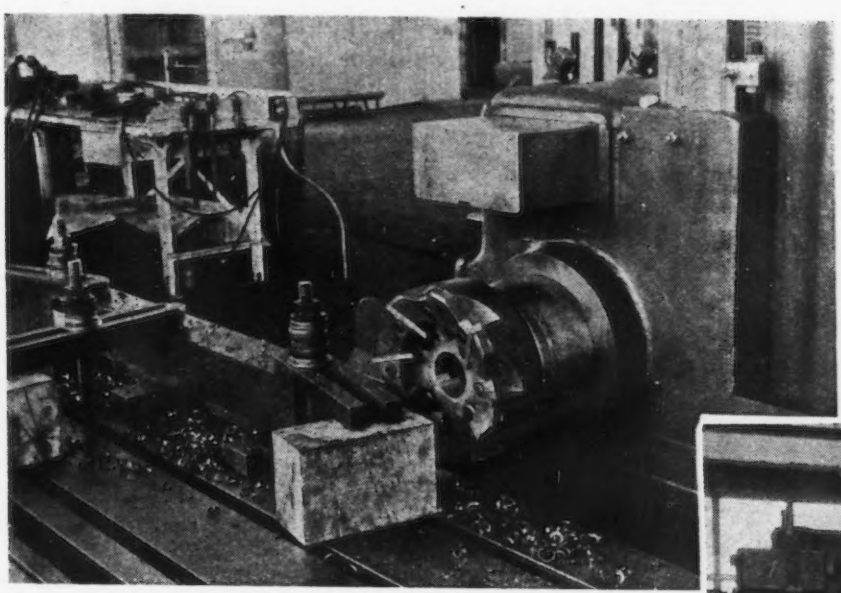
As has already been indicated, it is necessary to determine whether machine capacity is available to effect the metal removal rate possible in the workpiece itself. What the workpiece will take is frequently one thing; what the available machine can remove may be another. The two must be correlated: The power in the machine must be converted into cubic inches of metal removal per minute. Where the piece can take more removal than is possible with the power that can be applied in a given piece of equipment, then the rate inherent in the job must, of course, be lowered, but where the machine power is greater than the job justifies in terms of cubic inches moved, the machine will necessarily be restricted and its economical use hobbled. It is impossible to hit an ideal correlation of removal rate and power available except possibly on mass production lines set up for one continuous (at least 6 to 12 months) operation. But the two should and must be brought together; that is, the removal rate inherent in the job must be correlated as well as possible, with the power available in designated equipment. Otherwise, machines will either be under or overloaded. Either way the results are bad: If overloaded, the machine may stall and damage cutters and job; if underloaded, the economy of machine tool operation is vitiated and the cost rises.

The surface foot rate and, therefore, the spindle speed, has thus far been established. Before the machine can be intelligently and effectively operated the feed rate must be determined. But the biggest step has been taken in this direction when the metal removal rate was set. The rest is a simple problem in arithmetic.

An example will clarify this statement. Suppose a 10-in. wide surface is to be milled to a depth of 0.125 in. A 12-in. cutter will be properly specified, with suitable grades of carbide and correct cutting and clearance angles. This SAE 1115 steel component has a K-factor of 0.5 and is to be machined on a planer-type machine having a 30 hp motor direct connected to the head. The sectional area of the cut is, therefore, 1.25 sq in., and since the 30 hp can move 60 cu in. per min (the K-factor is 0.5), the feed rate is 60 divided by 1.25, or 48 ipm.

Before proceeding to the next step it is well to analyze some problems involved in making a selection of cutter diameter. Assuming that this workpiece is 40 in. wide by 120 in. long and its thickness through the thinnest section is 12 in. and assuming also that 0.500 in. of metal is to be removed from this piece, the first question that arises is "How will a 40-in. wide piece be milled? With what size cutter?" A few calculations will provide the answer.

A 12-in. cutter, milling a 10-in. wide pass will require four passes to completely sweep the surface. At



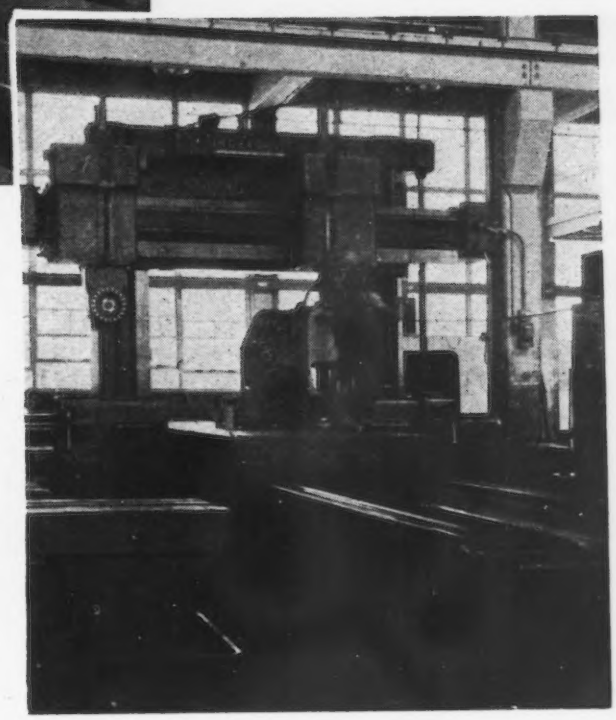
LEFT

FIG. 71—Heavy hogging cuts can be taken when the nature of the workpiece and the setup permit a close hook-up as shown here.

o o o

BELOW

FIG. 72—Machining of large components such as machine tool frames frequently requires a wide spread between cutter and machine bed, and introduces a serious problem of vibration.



48 ipm the cutting time is approximately 3 min per pass. The total cutting time, therefore, is 4 x 3, or 12 min for a ⅛-in. depth of cut. For the full ½-in. depth the time required is 4 x 12, or 48 min. The time for the return of the cutter at a rapid traverse rate of 150 ipm is 1 min, and therefore the total cycle time is 3 + 1, or 4 min per pass. For the 16 passes required to mill to ½-in. depth, the total time is, therefore 64 min.

Assuming that the same cutter will mill to a depth of ½ in. at a pass, then the feed rate will drop to 12 ipm since the sectional area will be 10 x ½, or

TABLE XII

Chip Loads for Various Diameter Cutters

Cutter Diam, In.	Stock Removal, Cu In. per Min	Feed Rate, Ipm	No. of Teeth	RPM	SFPM	Chip Load, In.
8	60	2'	8	300	630	0.0083
10	60	15	10	240	624	0.0062
12	60	12	12	200	200	0.005

5 sq in., and this divided into 60 cu in. per min will give a feed rate of 12 ipm. The cutting time per pass will now be 11 min, and the total cycle time 12 min. The total time for the 4 passes will be 48 min, and hence milling at ½-in. depth, even though the feed rate drops from 48 ipm to 12 ipm, reduces the total time from 64 min to 48 min, a saving of 25 pct.

Checking for the effect of an 8-in. cutter shows that this will cut a 6-in. path, and hence require seven passes. Using the more efficient ½-in. depth of cut, the feed rate will be 20 ipm and hence the cutting time per pass will be 6.5 min, and the cycle time 7.5 min. The total time for the seven passes will thus be 52.5 min. For a 10-in. cutter making an 8-in. path the time will be 48.5 min, and there is, therefore, little to choose between the 10-in. and 12-in. cutters. The saving in time by going to full depth immediately at each pass and thus eliminating the time necessary to bring the cutter into position for the greatly increased number of passes required when milling to only ⅛ in., is a major item and should be investigated for each job.

Checking Chip Load

While metal removal rates have been equated to horsepowers, and the machine will not, therefore, be overloaded, or better still, it will be as ideally loaded as circumstances permit, it is still necessary to check on the chip load to determine whether it is in line with good practice. Since the load per tooth depends upon such factors as the number of teeth in the cutter, it may well be that in certain setups the chip thickness is either too thin or thick for good results, even though the other operating characteristics are entirely satisfactory.

Checking the chip loads of the jobs in question will illustrate the nature of this step.

It will be remembered that three cutters were considered for this job, 8, 10 and 12-in. diam. The material is SAE 1115, and the suitable sfpm rate is in the neighborhood of 600. (Note that the selection of a surface foot rate is sufficiently accurate if the nearest spindle speed corresponding to the desired sfpm is chosen. Speed dials on modern machines have a large selection; still the gaps are relatively large and hence the nearest speed is specified.)

The data can now be tabulated as shown in table XII, and as will be seen, the chip loads are not impressive. For good practice they should be not less than 0.010 in. which only the 8-in. cutter approaches. The 12-in. makes the worst showing, as is to be expected, since the width of the cut with this mill is 10 in. The solution for this job is either, (1) use a larger powered machine (and this is unlikely since 30 hp spindles are not too common and 50 hp spindles are entirely uncommon), (2) reduce the width of the cut and increase the feed rate, or (3) decrease the depth of the cut and thus increase the feed rate. (The chip load increases in the same ratio as the feed rate; hence, if the ipm is doubled, the chip load is doubled.)

Because of its importance to production planning personnel, all these possibilities will be explored. First the horsepower will be doubled leaving all other specifications of the setup unchanged; then the width of the cut will be halved, leaving all other factors unaltered excepting, of course, those changed because of this decrease in the width of the cut; and finally changing the depth of cut by half will be explored.

The data are tabulated in table XIII; a glance at such a tabulation makes it possible to select the best set of specifications: Obviously, if a 50 hp spindle could be commandeered for this job it would be possible to remove this metal in a total of 30.4 min. (this is not floor-to-floor time but total cycle time) and still have a chip load of 0.008 in. The better of these, however, is the 31-min schedule with a 0.011-in. chip load. The machine will have 25 to 30 pct less down time with a 0.011-in. than with a 0.008-in. chip load. But assuming that a 50 hp spindle is not available, then the other possibilities must be explored, that is, the effect of changing width and depth of cut. This is done and alsc tabulated. Obviously halving the width or the depth of cut and leaving the metal removal rate the same doubles the feed rate and, therefore, the chip load. It is necessary to compromise between time and chip load, that is, sacrifice something in total time to get a reasonable chip load. It would seem that several choices are open as being equally good. The use of a 10-in. diam cutter with either a halving of the width or depth of cut and resulting in a 53 min time cycle and a 0.0124-in. chip load seems an excellent choice. Other choices may also be justifiably made, though the selection of a chip load in the neighborhood of 0.013 in. is to be seriously considered with the time cycle of 53 min.

It is noteworthy that an increase in the power from 30 to 50 reduces the time from a selected 53 to 31. The chip loads being about the same the cutter life will be about equal and hence the down time, so important in final costs, will be about the same.

Climb or Conventional Milling

Climb milling is always to be preferred to conventional milling provided only the equipment is suited for the climb method, which has a decided tendency to pull the workpiece into the cutter. As a result, the wear between the table screw and nut makes it possible, when using climb technique, for the cutter to pull the job into the cut an amount equal to this wear. Thus if the wear were 0.030 in. and if the chip load were already 0.010 in., the resultant attempted chip load would be 0.040 in. or the equivalent of increasing

the feed rate four times. This inevitably results in at least a stalled machine, and frequently a damaged cutter and even a damaged machine.

Most machine tools of recent design are equipped with so-called backlash eliminators or climb nut adjusters. The production planning personnel must be acquainted with this detail and schedule accordingly. If the machine is equipped with such adjustment, then the job should by all means be performed by climb milling. In this technique, the chip load is largest at the beginning of the cut, the resulting friction and abrasion to and on the carbide tip are reduced and, above all else, the cutting forces are directed downward against the solid portion of the machine tool, namely, the table or base. In conventional milling (using an arbor) the cutting forces are in a general upward direction, and hence tend to lift the workpiece off the table, being resisted only by the clamps.

Because the use and application of carbide is so new it is necessary that the production planning department specify the grinding procedure and cutter care and reconditioning. This involves (1) establishing a reasonable cutter life limit to the end that the carbide bits be removed long before they are unduly worn; (2) specifying the cutting and clearance angles (sufficient information is now available to make this a relatively simple chore); (3) setting up the machinery, tags, etc. to get the dull cutter from the machine to the grinding department, then to the grinder and finally to the shelf or back to the machine; and (4) issuing instructions or educating the operating personnel in the proper handling of this cutting material that will crack and break if subject to sudden blows, or impacts, as from careless handling or dropping.

It is necessary after an operation has been planned and initiated, that the first results of the scheduled run be examined for accuracy and surface condition and their conformity to the specifications. If not satisfactory, it may be necessary to start all over with the scheduling; reducing the feed rate, etc. However, before this chore is undertaken, the grinding should be examined, as well as other factors that may affect finish and accuracy. The length of the zero line on the cutting face of the blade should be checked to see that it is at least equal to the chip load multiplied by the number of teeth or the feed per revolution. For example, if the chip load is 0.010 in. and the number of teeth is eight, then the zero line must be not less than 0.080 in., and preferably 0.010 in. This factor is more often the cause of poor finishes than any other. All machine adjustments, such as gibs, should also be checked.

If these factors are carefully examined, and the previously outlined cautions are taken in the planning, the results as regards accuracy and finish should be entirely satisfactory.

Previous articles in this series covering carbide milling were as follows:

Part No.	*Subject*	*Issue Date*
1.	Fundamentals of carbide milling.	Feb. 13, 1947
2.	Low carbon steel and wrought iron.	Feb. 20, 1947
3.	Straight carbon and cast steel.	Feb. 27, 1947
4.	Heat-treated steels.	Mar. 6, 1947
5.	Armor plate, heat-treated alloy steel, stress proof steel, die plates.	Mar. 13, 1947
6.	Stainless steels.	Mar. 20, 1947
7.	Semisteel, Ni-Resist, alloy cast iron.	Mar. 27, 1947
8.	Factors governing cutter life, selecting feed rates.	Apr. 10, 1947
9.	Regulating life between grinds, cutter design.	Apr. 17, 1947
10.	Factors involved in good practice.	Apr. 24, 1947
11.	Tool grinding, reconditioning and blade setting.	May 8, 1947
12.	Converting to carbide milling.	May 15, 1947
13.	Planning carbide milling operations.	May 22, 1947

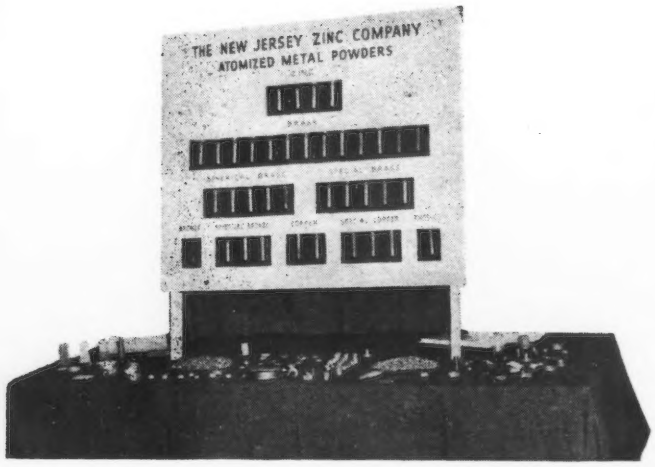
TABLE XIII

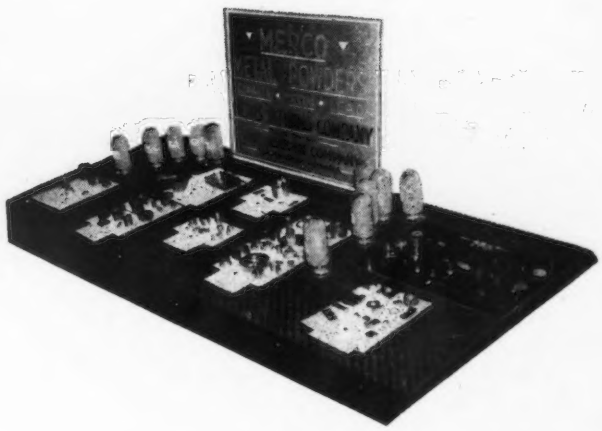
Data for Establishing Optimum Milling Conditions

	Cutter Diam, In.	Stock Removal, Cu In. per Min	Feed Rate, Ipm	No. of Teeth	RPM	SFPM	Depth of Cut, In.	Width of Cut, In.	Chip Load, In.	No. of Passes	Total Time, Min
Power Increased	8	60 100	20 35	8	300	630	0.500	6	0.0083 0.0145	7	52.5 35.0
	10	600 100	15 25	10	240	624	0.500	8	0.0062 0.011	5	48.5 31.0
	12	60 100	12 20	12	200	624	0.500	10	0.005 0.008	4	48.0 30.4
Width Decreased	8	60	20 40	8	300	630	0.500	6 3	0.0083 0.0166	7 14	52.5 58.8
	10	60	15 30	10	240	624	0.500	8 4	0.0062 0.0124	5 10	48.5 53.0
	12	60	12 24	12	200	624	0.500	10 5	0.005 0.010	4 8	48.0 52.0
Depth Decreased	8	60	20 40	8	300	630	0.500 0.250	6	0.0083 0.0166	7 14	52.5 58.8
	10	60	15 30	10	240	624	0.500 0.250	8	0.0062 0.0124	5 10	48.5 53.0
	12	60	12 24	12	200	624	0.500 0.250	10	0.005 0.010	4 8	48.0 52.0

Expanding Metal Powder Use

Metal Powder Assn. meeting features product exhibit . . . Expanding applications for metal powders indicated in technical discussion . . . Stainless steel powder arouses new interest . . . Production of steel backed copper-lead bearings described.





THREE typical exhibits of the 14 which were on display at the Metal Powder Assn. meeting, at the first such exhibit to be held at an MPA meeting.

As evidence of the growing interest in the use of metal powder parts in industry, the third annual spring meeting of the Metal Powder Assn., held at the Waldorf-Astoria Hotel, New York City, May 27, hit a new attendance high of 247 registrants. Actual attendance was considerably greater however, since many of those in attendance at the exhibits displayed by 14 manufacturers of metal powders, metal powder parts and equipment, did not register for the technical sessions.

The luncheon was highlighted with a presentation of a gift on behalf of the Metal Powder Assn. to F. E. Wormer, assistant to the president, St. Joseph Lead Co., New York, in appreciation of his efforts—as the first secretary of the group—in establishing the MPA on a firm foundation.

The technical program covered a variety of subjects of interest to the powder metallurgist.[1] Several of the interesting papers are revicwed herein.

Emphasizing the importance of the production of electrical and electronic components to the metal powder industry—previously pointed out by Patch[2]—E. I. Shobert, II, engineering dept., Stackpole Carbon Co., St. Mary's, Pa., presented a paper entitled "Electrical and Electronic Components from Powdered Metals." The author limited his discussion to a consideration of the role played by metal powders in the properties of parts such as electrical contacts, metal graphite brushes, permanent magnets, soft magnetic materials, and high frequency iron cores.

The use of electrical contacts made from metal powders was said to be tied in closely with other industries. An example of this is the use of tungsten tips as contacts on distributors for automobiles, where the amount of material required is determined by the requirements of the automotive industry. There are many other fields, however, in which the sintered contact materials are expanding and in which they hold the key to their own development. For instance, the small circuit breakers for domestic use in place of fuses were made possible by a unique design which itself was successful only because of the sintered contact materials of silver molybdenum and silver tungsten. In this and other cases where sintered contact materials are making their own way, the author held that while the sintered material is considerably more expensive than an equal volume of a metal or an alloy, it takes over a larger part of the function of the equipment, resulting in overall savings.

A considerable tonnage of powder materials is also involved in the production of metal graphite brushes used on commutators and slip rings in the automotive

[1] *The complete technical program was published in* THE IRON AGE, *May 27, 1947, p. 61.*

[2] *"Powder Metallurgy—Process or Product,"* THE IRON AGE, *May 22, 1947, p. 65.*

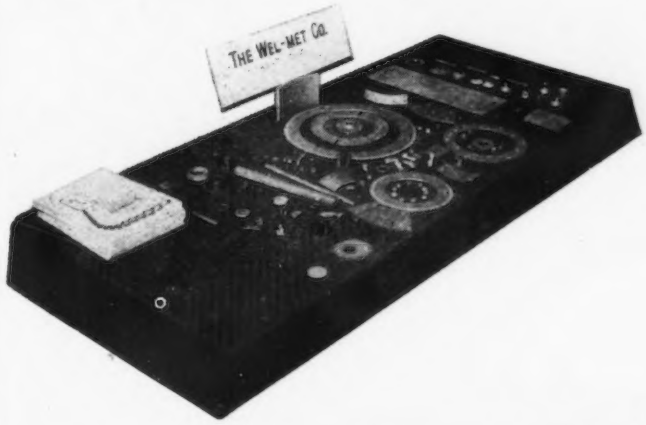
Stressed at MPA Meeting . . .

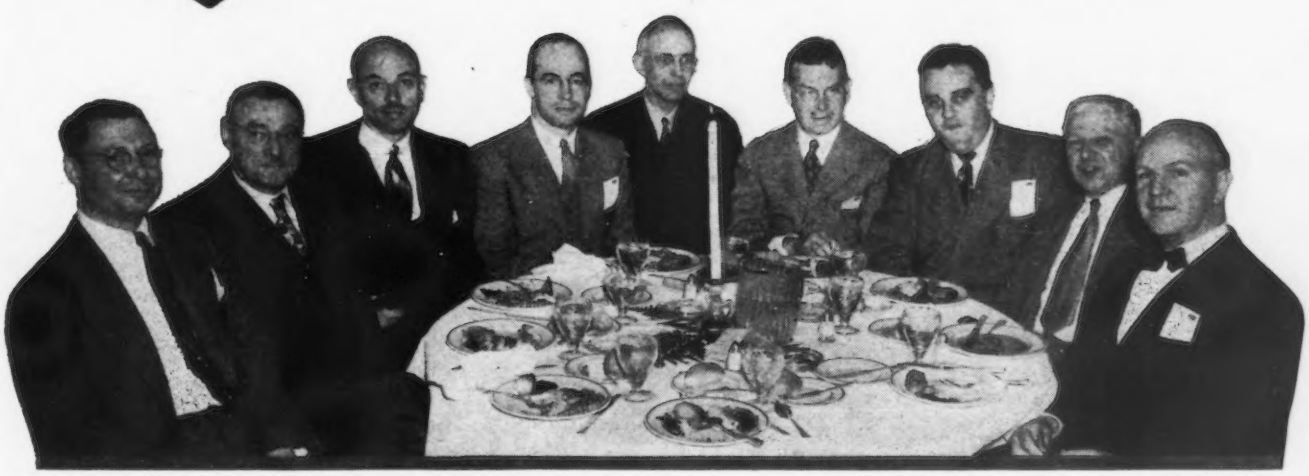
industry, in addition to the number of such brushes for aviation use, slip rings, alternators, and other similar applications. A consideration of the individual types of metal powders is even more important in this field than in the field of electrical contacts, since the materials have a considerable influence on the operation of a brush on a particular machine. Ordinary physical data on the materials is practically meaningless, since approval must be determined by testing on the particular machine in question. Friction, lubrication, electrolysis, arcing, oxidation, and commutation all play a part in determining the wear and operating characteristics of such brushes.

Shobert also made mention of the importance of the use of sintered metal composition for permanent magnets such as sintered Alnico II (the most important of the group), I, III and IV. The economics of sintered magnets are such that they hold an advantage over cast magnets in the range of 1 to 2 oz and offer greater mechanical strength, uniformity of magnetic properties, and improved surface finish. Over 2 oz, however, the economics are strongly in favor of the cast magnets, except where sintered magnets are required for strength, balance, or some other special reason.

The soft magnetic materials made from powders were said to have resulted in cheaper methods of fabricating and applying some of the complicated shapes which arise in the design of electromagnetic equipment. The applications in which sintered materials have competed successfully include pole faces for meters, field pieces for small motors and generators, magnetic circuits for small specialized relays and other similar uses. In view of the effect of impurities on the magnetic properties of soft iron materials, improved materials are necessary. For commercial reasons, the powder should be free flowing, compressible to reasonably high densities at pressures in the neighborhood of 40 tons per sq in., and should not contain occluded gases.

Although from a commercial standpoint, the field of powdered iron cores for high frequency applications is one of the largest fields in which metal powders are used, requirements placed upon the metal powders are most rigid. Applications include cores for loading coils, tuning coils, coil forms, shields, transformer cores, antennae, and similar high frequency applications. The advantages of the use of iron core transformers over air core transformers has resulted in the redesign of radio and all high frequency equipment. The iron core transformer has replaced the air core transformer with increased efficiency and lower cost on power circuits. Iron core tuning of circuits has replaced condenser tuning and trimming. Permeability tuning is replacing capacitor tuning and not only decreasing the cost, but increasing the selectivity and making possible some of the very small units.





OFFICERS of the Metal Powder Assn. Reading from left to right: R. L. Ziegfeld, acting secretary and treasurer; W. M. Weil, National Smelting Co., member of the board; F. E. Wormser, formerly acting secretary and treasurer; B. T. du Pont, National Radiator Co., member of the board; V. T. Price, Pyron Corp., member of the board; S. K. Wellman, S. K. Wellman Co., vice-president; H. E. Hall, Metals Disintegrating Co., president; P. E. Weingart, American Metal Co., Ltd., chairman of the board; and T. L. Robinson, S. K. Wellman Co., member of the board.

The manufacture of steel back copper-lead lined bearings was outlined by E. R. Darby, director of research, Federal-Mogul Corp., Detroit, in his paper "Copper-Lead Bearings from Metal Powder." The process, although not new, represents a rather interesting variation from the usual concepts of powder metallurgy.

In operation the process is continuous. Steel strip of the desired width and thickness passes from the coil form through straightening rolls past a powder spreader, through a controlled atmosphere electric sintering furnace with cooling chamber, through a set of compacting rolls and onto a storage reel. The powder is fed onto the moving strip from a hopper at the bottom of which is an adjustable distributor which spreads the powder evenly to the desired width and thickness, without compacting it. The speed of the moving strip and the temperature of the furnace are so regulated that at this stage only partial sintering of the powder and bonding to the steel are accomplished. In this condition the copper-lead layer can be compacted to almost theoretical density in passing through the rolls at the end of the cooling chamber.

The author pointed out that the mechanical properties of the copper-lead lining made by this process are higher than those of linings applied by centrifugal or gravity casting methods. The increase in elongation obtained is of particular value in forming operations, since bearing blanks may be cold flanged in presses without any cracking of the copper-lead layer and without rupturing its bond to the steel back.

To insure uniform quality, the strip is inspected in process at regular intervals for thickness, appearance or fracture, mechanical properties and bond. To obtain specimens for physical testing, a small area of the steel is coated with graphite just before it passes the powder distributor, and the position of this area marked on the edge of the strip. The powder will not bond to the steel in this area and after final sintering the thin alloy layer may be scored in outline and lifted from the strip. Flat test bars are cut from this piece by means of a template and pulled in a tensile testing machine.

Production of metal powders for commercial use created a need for means of determining the subsieve particle size distribution of the products and indicated the desirability of some method of size classification on a commercial basis. A laboratory instrument based on air elutriation according to Stoke's Law was described by E. C. Truesdale, research div., technical dept., The New Jersey Zinc Co., Palmerton, Pa., in a paper entitled "Apparatus for Air Classification of Metal Powders."

The instrument developed was found to be capable of accurate fractionation at particle diameters up to 40 microns for spherical particles and to give reproducible results for spherical or nonspherical particles, excepting flakes, up to 75 microns. Modification of the apparatus permitted conversion to a continuous feed, multiple stage classifier which was capable of sharp particle size cuts at favorably high recovery of recoverable fines. Both types of apparatus were described in detail by the author, and the results obtained with each apparatus were given for a variety of metal powders.

The characteristics of 18-8 stainless steel powder, the determination of physical properties and the working conditions to obtain these properties, were discussed by J. D. Dale, president, Charles Hardy, Inc., New York, in his presentation "Stainless Steel Powder," A typical chemical analysis of standard commercial stainless steel powder is as follows: 0.110 pct C, 0.022 P, 0.008 S, 8.98 Ni, 17.36 Cr, and 0.47 Si. A typical screen analysis of this powder runs as follows: —80+100, trace; —100+150, 3.0 pct; —150+200, 10 pct; —200+250, 5.8 pct; —250+325, 18.7 pct; —325, 62.9 pct.

Dale also referred to the progress being made by Micro-Metallic Co., Forest Hills, N. Y., in the production of stainless steel filters, and presented corrosion resistance data obtained by that company under various conditions of testing.

The author also made mention of another stainless steel powder application that is claimed to be arousing interest, that of cladding nonstainless surfaces with stainless steel powder. He stated that an effective flux had been developed for addition to the standard stainless steel powder which produces a clean, bright metal of uniform structure and with a good bond to the base metal. Reference was made to claims by the Powderweld Process Co., that welding by means of stainless steel powder is about twice as fast as welding under conventional practice.

Small Sendzimir Mill Rolls Magnetic Alloy

A SMALL Sendzimir precision cold strip mill[1] at Westinghouse Research Laboratories is now rolling 100-ft lengths of 0.025 in. Hiperco alloy down to 0.002 in. with seven passes from 12-in. reels on each side of the working rolls, at mill speeds up to 200 ft per min, according to laboratory officials. Hiperco[2] is a magnetic alloy that promises to reduce the weight of aircraft motors and generators by 10 pct. Very thin strips of the metal are needed to continue experiments with magnetism.

The two rolls of the mill that do the work measure less than 0.5 in. in diameter, and are said to give 40 times more compression than would larger rolls in ordinary mills. Each part of the roll mechanism is ground to an accuracy of 0.0001 in. to assure precision in rolling metal this thin. A Westinghouse Rototrol regulator maintains proper tension on the strip.

The mill, designed for Westinghouse by the Armzen Co. of Middletown, Ohio, stands less than the height of a man and is about as wide as an office desk. It is said a 100-ft length of metal twice as thick as a calling card can be rolled into a mile-long strip thinner than tissue paper with this equipment.

[1] *See "Small Precision Cold Strip Mill,"* THE IRON AGE, *Jan. 16, 1947, p 49.*

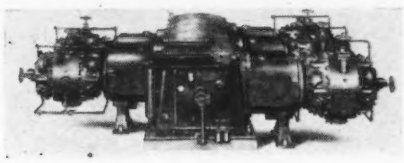
[2] *See "New Magnetic Alloy Opens Way for Lightweight Motors,"* THE IRON AGE, *Feb. 27, 1947, p 59.*

New Equipment . . .

Motor driven compressors, multiple head cold-riveting hammers, portable self-powered arcwelders, a plastics heating generator, material handling trucks, and aluminum belt conveyors are some of the new equipment items reviewed herein. Included are small heat treating furnaces, electroplating rectifiers, heavy duty switches, square gage blocks and tachometers.

Motor Driven Compressor

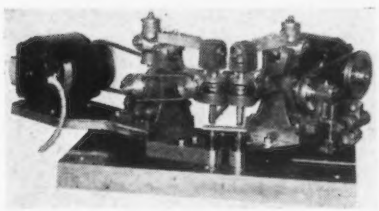
OFFERING space saving possibilities and adaptable for use in chemical, process, oil and gas, mining, construction and general manufacturing industries, a motor driven compressor said to be of entirely new design has been announced by *Cooper-Bessemer Corp.*, Mt. Vernon, Ohio. Designated Type JM, the compressor, available in six sizes and with a variety of compressor cylinders, offers a wide range of volumes and pressures for handling air and gas. It is built with from 1 to 6 crank throws and ranges in horsepower from 500 to 2750. The compressor stroke is 14 in. and it operates at a speed of 300 rpm. Power for driving it can be taken from a standard synchronous



electric motor, an engine, or a turbine. All cast parts are of Meehanite metal. Compressor cylinders are the same as those used on the Type GMV and are interchangeable. Provision can be made for low vacuums or for high pressures, as well as for all intermediate pressures. Dimensions of the JM range from 11 ft 7 in. to 24 ft 6 in. in length; from 13 ft 9 in. to 24 ft 2½ in. in width.

Cold-Riveting Hammer

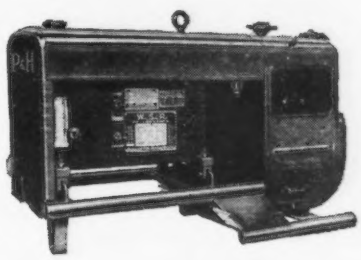
A MULTIPLE head cold-riveting hammer which forms two rivet heads simultaneously and has a minimum center line distance of 2¾ in., max 12 in., has been announced by *High Speed Hammer Co., Inc.*, 313 Norton St., Rochester 5, N. Y. This special high speed hammer is a bench type model with capacity for ⅛ to 5/32-in. rivets. Clutch mechanisms are hydraulically operated. Units for greater



center line distances and capacity are available.

Portable Welders

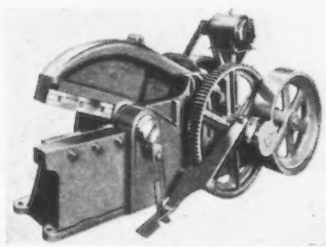
DESIGNED for shop, yard and field service, a self-powered arcwelder has been offered by *Harnischfeger Corp.*, Milwaukee 14. The WN-200 welder, available as a stationary or trailer unit, is an NEMA rated machine of 200 amp, but has a welding service range of 30 to 260 amp. Both types have engine and welder mounted on an all-welded frame of sturdy steel tubing and heavy angle iron. There is one control for any desired welding heat from minimum to maximum capacity. Arc response is automatic on all classes of work and with all types of electrodes, it



is said. Model WN-200 also has Visi-matic calibration plates which enable the operator to select instantly the exact welding current for each of the three classes of electrodes. The generator is rated 30 v at 2900 rpm and a heavy duty, 4-cylinder air-cooled engine of 26.5 hp supplies power for both models.

Automatic Shears

A NEW line of automatic alligator shears has been designed by *Doelger & Kirsten Corp.*, 3015 W. Chambers St., Milwaukee, for use where accurate dimensional cutting is required. A foot-operated clutch and brake mechanism permit the operator to feed the shear and adjust the cut as required. For continuous operation the foot treadle may be latched



down. The mechanism is said to assure accurate shearing under all conditions. Shears are available in a variety of styles and seven sizes.

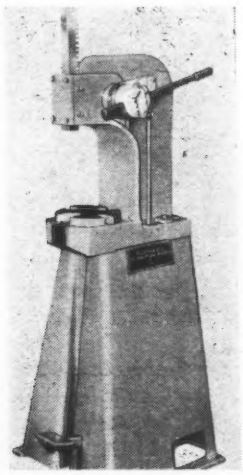
Plastics Heating Generator

DESIGNED for plastics processing, a dual timer 40.90 megacycle dielectric generator ranging from 2 to 200 kw output, has been offered by *Westinghouse Electric Corp.*, Pittsburgh 30. A special cubicle provides two sets of operating controls to permit alternate operations of the generator on two different time cycles, enabling a single generator to supply heated plastic preforms alternately to two presses operating on different loads. Two adjustable automatic timing relays built into the control panel provide alternate power-on periods from 0 to 165 sec each. A capacitductor type high Q circuit provides

a high rate of heating, easy heating of low power-factor material and effective heating of low loss-factor preforms, it is said.

Production Press

WHITLEY Model No. 12 production press designed for one man operation and suitable for



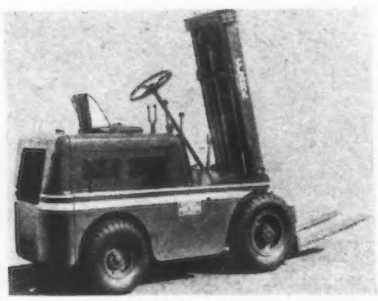
fast precision assembly in tool and machine shops has been offered by *Rodgers Hydraulic, Inc.*, Minneapolis 16. The ram is adjusted against the work by hand and pressure is applied by foot. Pressure is held at all times when clutch is engaged, it is claimed. The press has a capacity of 1 to 4 tons, with capacity over table of 11⅜ in.; maximum diam of work, 14½ in. Overall height of the press is 54 in.; approx weight 350 lb.

Timing Device

A TIMING device for use on Air-Hydraulic presses has been announced by *Air-Hydraulics, Inc.*, 401 Broadway, New York 13. This timer assures delivery of the full predetermined pressure set on the pressure control gage. The action of this device is reverse under pressure, automatically completing the cycle of each ram stroke after delivering the full predetermined pressure. In conjunction with an indexing unit, the press and timing device may be set for completely automatic multiple cycling in all types of assembly, forming, marking and other operations in volume production work. Ram dwell may be set at from fractional parts of a second to 2 min, a factor important in plastic applications.

Fork Lift Truck

YARDLIFT-40, a pneumatic-tired fork lift truck introduced by *Clark Tructractor Div.*, Battle Creek, Mich., has been designed for outside work and where surfaces are too uneven for solid tired machines. The unit is said to be entirely new as to engineering, design and application and has a 4000-lb capacity at 24 in., a lift of 120 in. and 85½ in. overall height. It features a center-pivoted steering axle. A new type of drive axle permits a 42-in. overall width and maneuverability and a heavy duty transmission provides speeds of 9.4 mph in high and 2.9 mph in low, both forward and reverse. Other standard equipment includes a mechanical governor, a water pump with thermostatic control and a



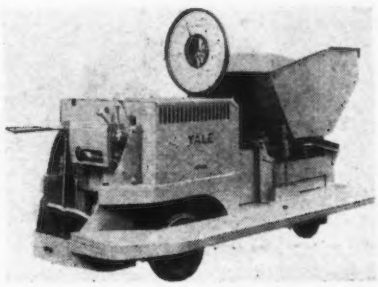
new type driver's seat with a backrest. Minimum clearance with the truck empty is 5¼ in. under the center of the drive axle.

Portable Elevating Table

MADE of steel throughout and constructed to lift and carry a load of 1 ton, a portable industrial elevating table announced by *Montgomery & Co., Inc.*, 53 Park Place, New York 7, has a minimum and maximum height from floor of 26 and 43 in. respectively. The table has been designed for use in machine shops, tool rooms, punch and plastic molding die departments. A hand wheel raises or lowers the table ⅜ in. per revolution. Dimensions of the table top are 20 x 32 in. Overall width of the table is 26 in.

Scale-Dump Truck

ANNOUNCEMENT of a versatile combination of three different handling tools in a single mobile unit for weighing out batches, transporting them about the plant, and dumping them into furnaces, tanks or hoppers, has been made by *Yale & Towne Mfg. Co.*, Philadelphia. Called a portable batching scale-and-dump combination, the truck is used in enamel frit making, chemical compound-



ing, and electric furnace metallurgy. The 40-cu ft dump hopper is supported on the platform of the scale by four coil springs which give the scale protection against shocks of dropping heavy loads into the bin and transporting over rough areas. The scale has a 24-in. diam shatter proof glass-protected dial which is graduated in 5-lb gradations and records loads up to 3000 lb.

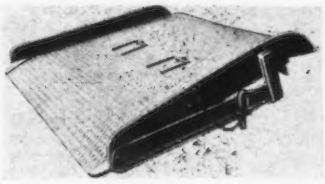
Aluminum Belt Conveyor

CALLED the Mercury, a prefabricated, all-aluminum, belt conveyor has been announced by the *Patron Transmission Co.*, 129 Grand St., New York 13. All components such as chain, belt, sprockets, channels, frame and other parts are constructed of heat treated aluminum alloy, said to provide ample strength plus lightness which make easy handling. It is rust and corrosion proof, resistant to most acids, chemicals and fumes, and suitable for use in production, assembly, shipping and warehousing. Widths range from 6 to 60 in.; height from 15 in. up; standard height is 36 in. Any speed up to 100 fpm is provided. Load capacity is 250 lb per sq ft; pulling load, 6100 lb. The conveyor is prefabricated in 5-ft sections.

Bridge Ramp

DESIGNED for use with fork trucks on railroad sidings, a bridge ramp which has a load capacity of 15,000 lb and can be placed and secured by one person in less than 2 min, it is said, has been

announced by the *Elizabeth Iron Works*, Elizabeth B, N. J. The ramp is available in sizes and types to span gaps from 5 to 58 in. with differential in heights up to 7 in.



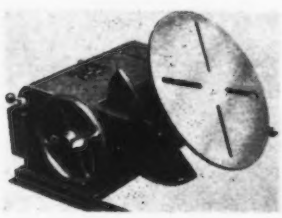
The riding surface is nonslip steel plate reinforced with shock plates at corners. Side stringers add rigidity and act as a safety guard.

Diamond Finishing Compound

DEVELOPMENT of a technique for the application of diamond grit to the full range of finishing operations where this polishing medium should be used, has been announced by the Industrial Processing Div., *Magnus Chemical Co.*, Garwood, N. J. This technique utilizes colored, premixed diamond compounds in tube or stick form. Precision graded diamond grits provided in scientifically proportioned compounds ready for instant use, contain the proper percentage of diamond for each grade size. These compounds, supplied in eight particle sizes from approximately 120 microns, for extra coarse cutting, to approximately 1 micron, for super high micro finishing, are available in either the stick form or in paste form in a tube. Either type is said to insure speedy and economical application.

Bench Model Positioner

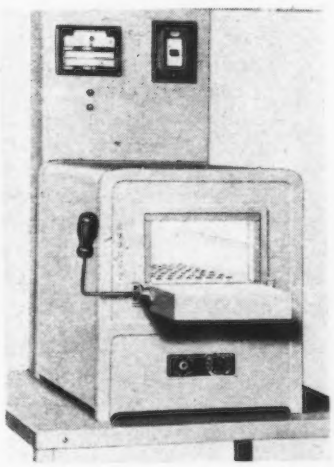
FOR work weighing up to 100 lb, a power-operated bench model positioner has been manufactured by *Ransome Machinery Co.*, Dunellen, N. J., which is said to provide a fast, efficient tool for



positioning small work such as is encountered in welding, assembling, repairing, and grinding. Work may be tilted to 135° and locks in any position at any degree of tilt. It may also be revolved 360° by a ⅛ hp single-phase reversible motor. A disengaging clutch permits free-wheeling when desired. A lever-operated varidrive pulley permits a speed range from 0.21 to 5 rpm.

Heat Treating Furnaces

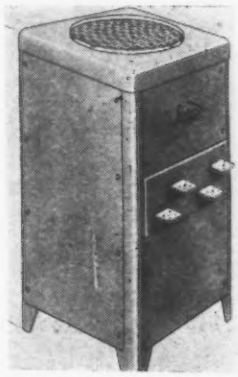
TWO recirculating air draw furnaces, Model ACL for temperatures to 900°F and Model ACH designed for operation to 1200°F, are offered by *Cooley Electric Mfg. Corp.*, Indianapolis. Both furnaces have been designed to provide accuracy and uniformity required in low temperature heat treating operations. They may be used for tempering or drawing carbon and high speed steels, nonferrous heat



treating, and are suited for tool and die tempering. Production of small parts and laboratory testing of paints and plastics are other uses listed. A temperature uniformity of plus 5 minus 0° may be obtained. In operation, an impeller fan mounted below the perforated cast metal hearth plate forces air up between the baffles and the heating units. Air circulates down through the work and back to the fan. Power input of both furnaces is 4 kw at 230 v and both will accommodate 50 lb of parts.

Electroplating Rectifier

A LIGHTWEIGHT, portable rectifier unit for supplying electroplating power, developed by *Electronic Rectifiers, Inc.*, 737 N. East St., Indianapolis 2, is said to deliver 1500-amp current at 6 v or 750 amp at 12 v. The unit is self-contained, requiring no special foundation and eliminating extensive bus-bar connecting systems.



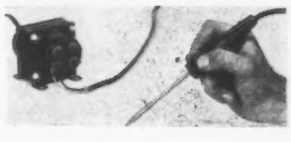
The only moving part is the blower fan. Air draft moves upward past the rectifier cooling fins and exhausts at the top of the cabinet. The unit may be equipped with a diverter to direct heated air wherever desired. Portability makes it suited for on-the-spot installation in production lines wherever plating facilities are needed. The unit weighs 550 lb and may be suspended or bracketed to the wall when floor space is at a premium.

Tungsten Electrodes

A NEW line of tungsten electrodes for atomic-hydrogen and inert-arcwelding has been announced by the *General Electric Co.*, Schenectady 5. Suitable for manual or automatic welding, the electrodes are said to be free from nonmetallic inclusions, segregation, slivers, cracks, seams and pipes. They are available in diameters ranging from 0.040 to ½ in. and in lengths from 3 to 24 in. Diameters are held to 0.001 in. tolerance.

Midget Soldering Iron

A NEW lightweight Calrod soldering iron known as the Midget, has been announced by the Industrial Heating Div., *General*

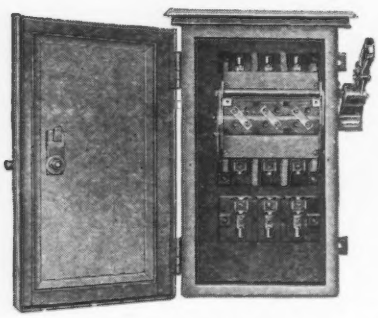


Electric Co., Schenectady 5, Designed for precision soldering where space is limited, such as radio, instrument, and meter ap-

plications, the iron is available with tips ¼ and ⅛ in. in diam. The Midget is 8 in. long and weighs only 1¾ oz without the cord, making fingertip soldering possible. It is rated 25 w, 6 v, and is used with a 115/6 v insulating transformer. A transformer providing 4 taps for variable heat is also available. The Calrod heater which forms the heat source is built into the tip of the iron to within ½ in. of the working end.

Heavy Duty Safety Switches

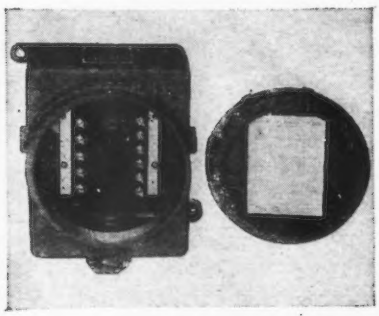
TYPE A safety switches of split-arc, heavy duty design have been announced by the *Electric Controller & Mfg. Co.*, Cleveland 4. Switch construction employs steel parts of extra heavy gage, which are cadmium plated; all actuating parts are case hardened. V con-



struction provides double, split-arc break and high arc-rupturing capacity. Quick-make is obtained by a quick manual thrust of the operating handle which forces the moving contacts into the V-stationary contacts and locks them in this position under heavy pressure. If contacts are not fully closed under pressure, the switch will automatically open when the operating handle is released, it is said. The switch opens easily by striking the under side of the operating handle and quick-break is obtained by two oversize helical springs. Single and double throw switches of either indoor or weatherproof type are available.

Level Control

DESIGNED for general application and the chemical processing field, type 10CB1X level control manufactured by *Photoswitch, Inc.*, 77 Broadway, Cambridge 42, Mass., contacts the liquid through stainless steel probe rods with no floats or other moving parts required in the tank. Vacuum tubes are not used and accuracy is said to be independent of temperature and pressure. This instrument is described as an ac control that combines a probe circuit and trans-



former to operate a dc relay. Two probe rods wired to the control project into the tank to the levels corresponding to the low point where pumping is to start, and the high point at which pumping stops. When the level of the liquid falls below the lower probe, the level control closes the electrical circuit controlling the pump or valve. When the liquid rises to the level of the upper probe, the fluid acts as conductor of the minute current at low voltage required for operation of the relay. Opening of the circuit results and pumping operations stop. The instrument may be supplied in an explosion-proof housing or a pressed steel, dust tight enclosure.

Square Gage Blocks

LIFETIME-CARBIDE square gage blocks in a full range of sizes has been offered by *Fonda Gage Co.*, Stamford, Conn. The square blocks are available in grade A (±0.000004 in.) and grade B (±0.000008 in.) quality and in the full range of sets and sizes available in rectangular blocks manufactured by the company. Individual blocks range in size from 0.050 to 4.000 in. and complete sets are made up of 35 and 82 pieces. Special sizes are available to order.

Tachometer Indicators

TYPE 42 electric tachometer indicators for use with Metron tachometer heads for direct measurement of speeds ranging from 1 to 100,000 rpm, have been announced by *Metron Instrument Co.*, 432 Lincoln St., Denver 9. Over 50 standard speed ranges are available and the dial can be calibrated in any units such as knots, lb per hr, fps, rpm, etc. These tachometers complete consist of the head, which can be located any distance from the indicator; the panel-mounted indicator and the junction box mounted on the rear of the panel. Units operate on 110 v, 60 cycles ac or on whatever dc voltage is available.

Hand Tachometer

DESIGNED for quick and positive checking of speeds, both clockwise and counterclockwise, of motors, drill presses, shafts, tractor power take-offs, cylinder speeds of combines, circular saws and grinding wheels, a hand tachometer has been announced by *AC Spark Plug Div., General Motors Corp.*, Detroit. A special feature is its small size; it may be held in the palm of the hand when making tests. It is equipped with two interchangeable rubber tips, one for recessed shafts and pulleys, the other for flat surfaces. The tachometer is finished in chrome plating to withstand corrosion or rust.

Aluminum Casters

PRODUCTION of aluminum-wheeled casters has been announced by the *Market Forge Co.*, Everett 49, Mass. The aluminum alloy of which these casters are made is said to have higher tensile strength than cast iron. These casters are particularly suited for use in plants where explosive hazards exist as there is said to be no danger from sparking. The wheels are also electrically conductive to ground static electric charges. Over 50 pct reduction in weight is claimed when compared with semisteel wheels of the same diameter. The face of the wheel is machined concentric with the axle and runs on roller bearings equipped with hardened inner races. These casters are available in both swivel and rigid types equipped with 4 x 2, 6 x 2 and 8 x 2 in. aluminum alloy wheels.

Here's How to Make a Name for Yourself —in 55 Hours!

FAST! Here's 2 metal pattern jobs that ordinary methods take lots of time and effort to produce. Using a Rotary Head Milling Machine, they were simplicity itself. Operator accurately located each workpiece and one working center. The rest was simply following blueprints and simple arithmetic.

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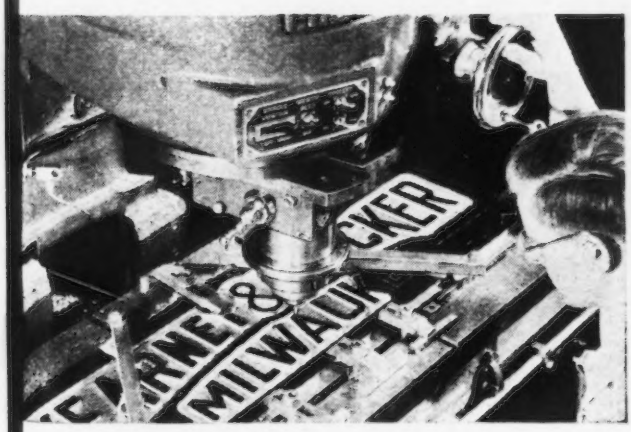
MILWAUKEE ARE 1/8 INSTEAD OF 1/16 WIDTH OF OTHER LETTERS
SPACING BETWEEN LETTERS AND BORDER 1/2 UNLESS OTHER-
WISE INDICATED
KEARNEY & TRECKER
MILWAUKEE

DIRECT! Regardless of jobs — pattern molds, tools, dies, hobs, cavity molds or production parts, the Rotary head milling machine transmits the blueprint dimension direct to the workpiece. No fussing with templets or models. Operator relies on simple, precise control of cutter and table movements.



ACCURATE! Machine features precision control of all cutter movements in any plane — enables operator to accurately locate and generate complex angles and contours. It reduces chance for error, because most jobs, even if somewhat large or complex can be completed in one or two set-ups.

The Kearney & Trecker-Milwaukee Rotary Head Milling Machine offers a conservatively estimated 35% savings in use on a major percentage of tool, die, mold, or production work within working range. For complete data write for bulletin 1002C

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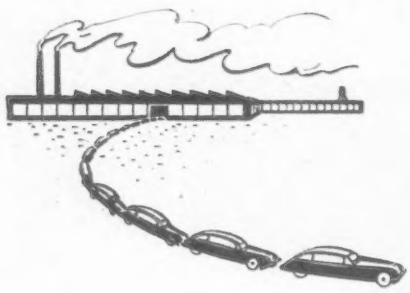
4722

Assembly Line . . .

WALTER G. PATTON

• Pontiac's new plating plant is largest in the world . . . Ford is operating without its foremen . . . Work for armed services is increased at Continental's Aviation Division.



DETROIT — More than 900 tons of plate and structural steel were required for the new plating plant recently placed in operation by the Pontiac Motor Car Co. Between 500 and 600 tons of steel were used in the plating tanks alone and between 300 and 400 tons of structural steel were required for the plating machine.

This huge fully automatic machine for plating metal parts covers an area of 33,000 sq ft and consists of three sections in line for plating copper, nickel and chromium.

Incorporating the most modern plating equipment and methods, the new Pontiac machine is approximately 50 ft wide and 660 ft (one-eighth of a mile) long. Capacities of the plating tanks are staggering: copper plate — 58,000 gal; nickel plate 67,200 gal; chromium plate—15,700 gal. Total capacity of all tanks is 301,520 gal or the equivalent of 40 tank cars.

Seven storage tanks are required to serve the three plating units and these have an additional capacity of 158,152 gal, bringing total tank capacity to nearly half a million gal for the entire system.

Many interesting examples of modern plating methods have been incorporated in the new Pontiac facilities, including automatic heat controls for all heated tanks and level controls for most rinse tanks. The bottoms of rubber-lined tanks are covered with loose bricks to protect linings from falling parts. A complete de-ionizing unit has been provided to furnish soft water to the copper and nickel sections.

Each section has its own conveyor which brings parts loaded on racks from the polish and buff departments to the transfer points at which they enter the machine. Transfer from the conveyor racks to the plating machine is entirely automatic and unloading from the machine is accomplished in the same manner.

Many novel safety features have been included in the new Pontiac installation. A catwalk is provided along the length of each unit for workers to check the operation and service the machine. Along this catwalk a switch cord may be pulled, stopping the entire operation. At several other points, switches are provided for the same purpose. A master panel at the starting end of the line indicates the point at which the machine was stopped. Only at the master board may the machine be started again and then not until the trouble light is off and a warning horn has been sounded for at least 30 sec.

A description of individual operations required in plating grill blades will serve to emphasize the scope of Pontiac's new automatic installation.

For example, grill blades from the stamping department are first clamped into a jig on a conveyor belt and carried to buffing and polishing wheels. Hand polishing follows automatic buffing after which the parts are ready to enter the plating machine.

POLISHED and buffed parts first enter a series of "stall showers" where forced sprays apply cleaning and rinsing solutions. Copper is plated first, serving as a base for nickel and chromium. Following copper plating, the parts are again cleaned and buffed.

Parts are next conveyed to the huge nickel plating tanks. Following the nickel application chromium is plated on the parts which are then ready to be assembled on new Pontiac cars.

Full-scale operation of the new plating plant commenced early in April, just 13 months after the project was started. According to Pontiac officials, capacity of the new installation is adequate to meet the increased production schedules for bumper guards, grill blades and the famous "silver streak" emblem which is a distinguishing feature of all Pontiac cars.

Incidentally, three important steps have now been completed in Pontiac's huge postwar expansion program. In addition to its new electroplating system, Pontiac's axle plant has been moved to a new plant; the motor assembly line has also been transferred to a new location.

Shifting of machines to a new motor plant is scheduled to get under way the latter part of this month. This will be a difficult operation requiring, for example, the dismantling of the cylinder block machines, moving and setting up again at a new location.

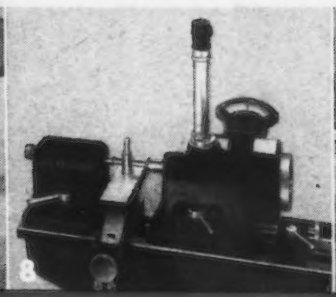
Pontiac's foundry expansion plans call for an increase in capacity of 50 pct. Two new 108-in. cupolas are scheduled to go into operation within a few weeks. At that time, the four present cupolas will be rebuilt to 102-in. diam. A new foundry distribution system is already in operation.

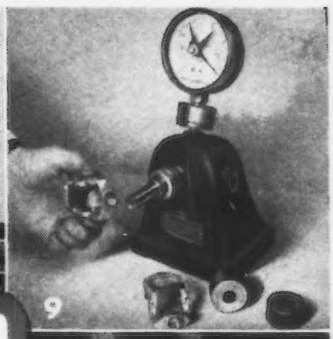
PREDICTIONS by FAA that the foremen's strike would quickly paralyze operations at the Ford Motor Co.'s huge Rouge plant have not materialized. To the contrary, Ford production for all lines except the Mercury has been maintained during the past 6 days at approximately scheduled rates. The Mercury line has been shut down by a recent strike at Murray Corp., a prominent Ford supplier.

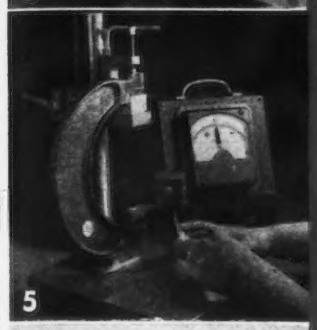
Meanwhile, FAA has been losing support from labor sources. AFL teamsters which were honoring picket lines when the strike started have been ordered by their international board to "go through the lines." Simultaneously, UAW (CIO) has rescinded an earlier ban on UAW drivers hauling supplies into the Ford plants.

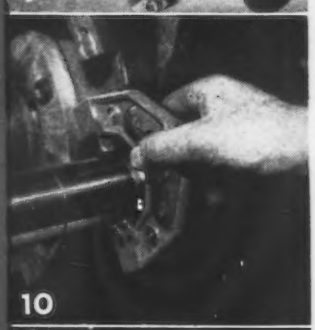
The company has announced that 52 out of 60 foremen in the Buffalo

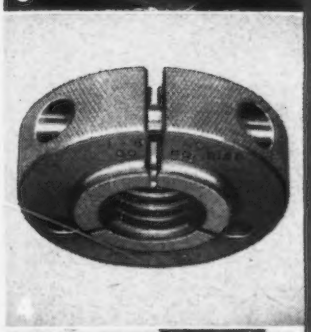
(CONTINUED ON PAGE 128)

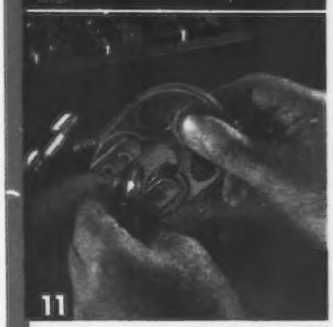












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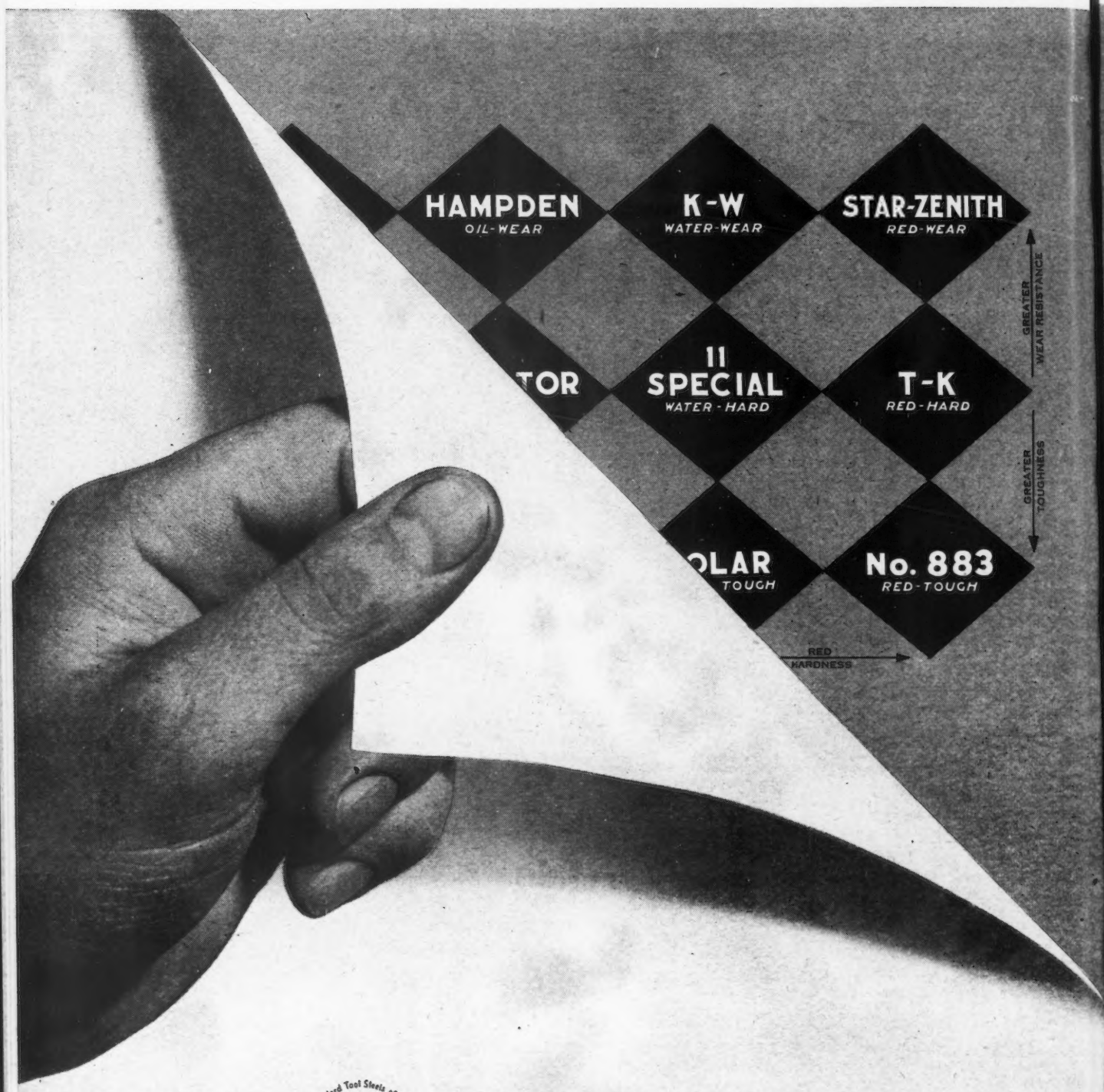

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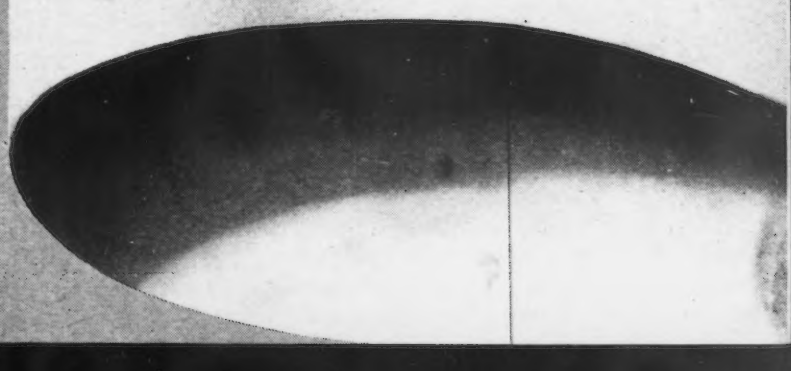


Washington . . . L. W. MOFFETT

• Steel study prepared for Senator Murray conflicts with industry view . . . Calls for 20 million ton expansion as necessary for full employment.

WASHINGTON — Directly conflicting with the position held by the industry, a special report prepared at the request of Sen. James E. Murray, D. Mont., concludes that there must be a 20 pct increase in steelmaking facilities if the nation is to realize jobs for all who want them.

More specifically, the report now in the hands of Senator Murray, who was one of the authors of the full employment bill, declares that on the basis of steel history over the past half-century, the requirements by 1950 will call for "approximately 20 million tons in excess of present capacity."

The report corroborates a recent Labor Dept. estimate that by 1950 the United States will probably need steel ingot production ranging from 98 million tons to 122 millions—the smaller amount seen as required should maufacturing trends lean toward consumer goods, and the larger amount expected should the fabricating emphasis be placed on producer goods.

On the other hand, while the present demand is considerably in excess of production, industry officials feel that the steel requirements over the next 5 to 10 years will not average more than 80 million tons against the present capacity of more than 91 millions. This requirement figure allows about 6 million tons for export purposes.

The report was made by Louis H. Bean, as analyst in the Budget Bureau's fiscal division, where his work was concerned chiefly with the fiscal aspects of full employment. It was compiled just prior to his becoming an administrative assistant to the Secretary of Agriculture.

Mr. Bean charts the longtime record of steel production in the United States and foreign countries. For domestic production, Mr. Bean finds distinct trends in (a) steel produced in previous years of virtually full employment (1929, for instance), (b) in steel required per person employed in civilian production, and (c) in the different levels of steel production which have been associated with different levels of unemployment.

"Projections of these trends of past experience to 1950," said Mr. Bean, "point to full employment requirements for steel by that year of around 110 million tons or about 20 million in excess of present capacity."

IN addition to these estimated domestic needs, the report declares, production of steel outside the United States is indicated at 50 million tons below what it would have been under full employment conditions had the war not destroyed many steel plants in Europe. Based on the rate of recovery after World War I and the depression of the early thirties, it further estimates that there will be a large foreign demand for American steel for some years to come. It is pointed out that European production, even under wartime necessity and stimulus, declined from 97 million tons in 1939 to about 52 million in 1945 as the steel plants were bombed out.

Aside from these observations, the report is concerned chiefly with the relationship of steel production to employment. Two facts stand out, the report says—the level of steel production obviously goes down with increasing unemployment but for each level of unemployment the underlying trend of production is a rising one.

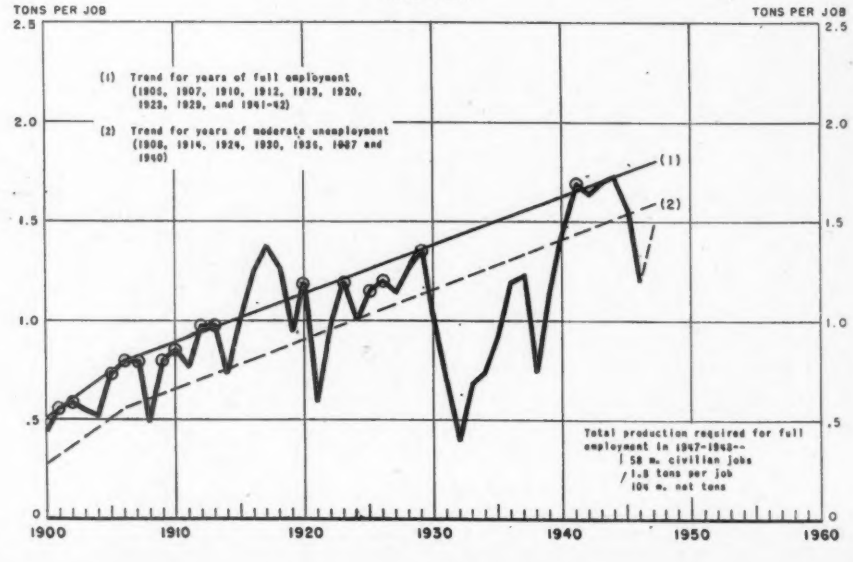
It is noted that the production trend has risen from one prosperity year to another during the period from 1900 to 1930—in 1903, 16 million tons; in 1907, 26 million; in 1913, 33 million; and, in 1929, 63 million. In 1941, the production was 83 million tons at a time when about 8 pct of the total labor force was without work. By projecting

CHART I

THE RISING VOLUME OF PRODUCTION OF STEEL AND CASTINGS REQUIRED TO SUSTAIN FULL EMPLOYMENT

(SHOWN IN TONS REQUIRED PER PERSON EMPLOYED IN ALL CIVILIAN JOBS)

1900-1947



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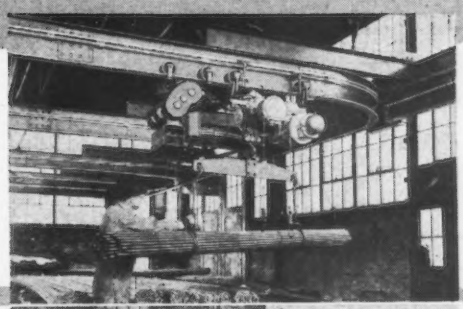
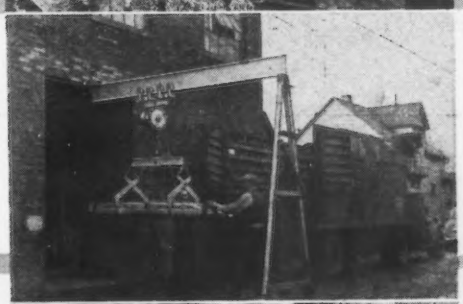
From 26 to 48 tons per day.

By furnishing definite overhead routes for the movement of bar stock, congestion was eliminated. Free flow of materials to production machines nearly doubled their output.



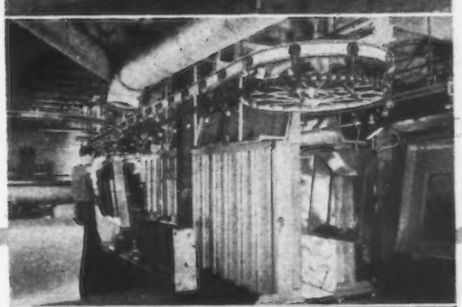
HANDLING COST
Saving of $150 in 4 months.

Transfer of sheet metal from truck to storage is costly when handled sheet by sheet. A simple system such as this actually saved $150 in handling cost within four months.



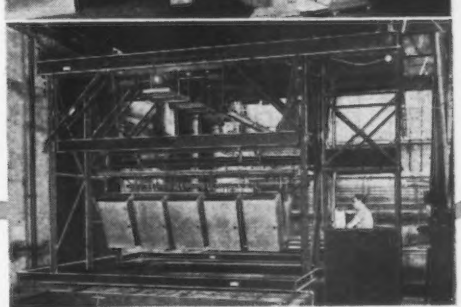
TIME SAVED
Drying time reduced 70%

Passage of metal furnace parts through infra-red dryers cuts 70% from the time formerly required for drying. This operation on monorail also eliminates costly handling labor.



INCREASED CAPACITY
30% more units moved through process

Nearly a third more units can be handled from tank to tank throughout the cleaning process. All handling is controlled from cab by a single operator.



LABOR SAVED
Unloads truck with 26 less man hours.

Operators claim to save $20 per truck over former unloading costs. With power operated equipment and special grab for handling 2-ton loads, complete safety is assured.

Let an American MonoRail Engineer explain how similar savings can be made in your handling methods. Write for Bulletin C-1 showing successful applications.

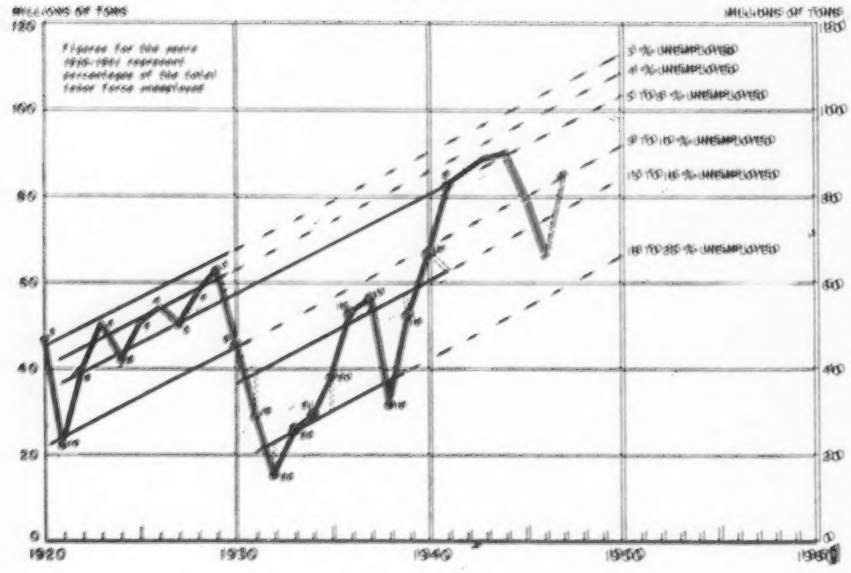
THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE — CLEVELAND 7, OHIO

CHART II

PRODUCTION OF STEEL INGOTS AND CASTINGS AND UNEMPLOYMENT

1920-1947



this trend into 1950, the requirement would be about 100 million tons.

This does not take into account overall population growth nor the growing labor force. The report therefore presents the annual totals on a basis of those employed in civilian jobs (see Chart I). The industry's predicated demand, on the other hand, is based on total population.

THUS, in Mr. Eaun's study, in 1900 steel production amounted to .5 tons of steel for each employed person; by 1913, it had doubled to amount to 1 ton per job; in 1929, a virtually full employment year, it had increased to 1.35 tons per worker; in 1941, to 1.6 tons; and, it is indicated, for 1947-48, 1.8 tons for every person employed.

It should be noted at this point that the steel industry uses a different approach, basing its estimates on the consumption per capita of total population. Mr. Wilfred Sykes, president of Inland Steel Co., has presented figures to show that steel requirements in the 1920-29 period averaged about 770 lb per person of population.

According to this reasoning, steel consumption fell from 752 lb per person in 1920 to 350 lb in 1921; in 1932, it dropped to 236 lb per person although the demand had risen to 978 lb in 1929. In only two years during the period 1920-40 (1928 and 1929) have requirements risen above the 900 figure. In 1947, according to this method of figuring, demand should be around 1200 lb per person.

In the estimate of Mr. Sykes, the demand should average about 1000 lb per person from the current year until 1955. This, it is said, is based on a probable population of 144 million in 1950 and 148 million by 1955. On this basis the latter figure would call for a total production of 74 million tons of steel for domestic use. Allowing about 6 million tons for export this would boost production requirements to about 80 million tons.

HOW much employment would there be if present steel production were down to 80 million tons, or 60 million, or 40 million? The report offers another graph (see Chart 2) to provide a basis for an estimate, giving both production and employment levels from 1920 to date. Thus, in 1920 and 1929 there was 3 pct unemployment; in 1932-33, 25 pct, and so on.

The study quotes the 1946 annual report of a major steel company as saying that on the basis of past records "the long-term outlook is for the average use of about two-thirds of capacity." Mr. Eaun goes on to say that if this forecast held true for the industry as a whole,

((Continued on page 130))

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WE NAMED HIM BULLET -- NOT CUZ HE'S SECOND TO TH' BULL, BUT CUZ IF YOU BUMP INTO HIM HE HAS TO GO BACK AN' ASK WHERE HE WAS GOIN'!
OH, NOT THAT BAD -- BUT THEY SENTT HIM TO AUSTRALIA ONCE, AN' WHEN ASKED IF TH' OCEAN WAS ROUGH, HE SAID, WHAT OCEAN?
6-6 J.R.WILLIAMS
ALL BUSINESS

3600 *pistons classified per hour*

Shock absorber pistons come by conveyor from the centerless grinders to this Sheffield "Airlectric" Automatic Gaging Machine for inspection and dimensional classification.

The operator merely feeds the pistons into a chute. The "Airlectric" then automatically segregates undersize and oversize units. At the same time, those which fall within tolerance limits are separated into five classifications for subsequent selective assembly—and at the rate of 3600 units per hour.

If you require accurate inspection on large volume production, you can make material savings with machines similar to that described here. Chek with Sheffield on multiple and automatic gaging problems.

the Sheffield corporation

Dayton 1, Ohio U. S. A.

Standard Gages Shipped in 24 Hours

2380

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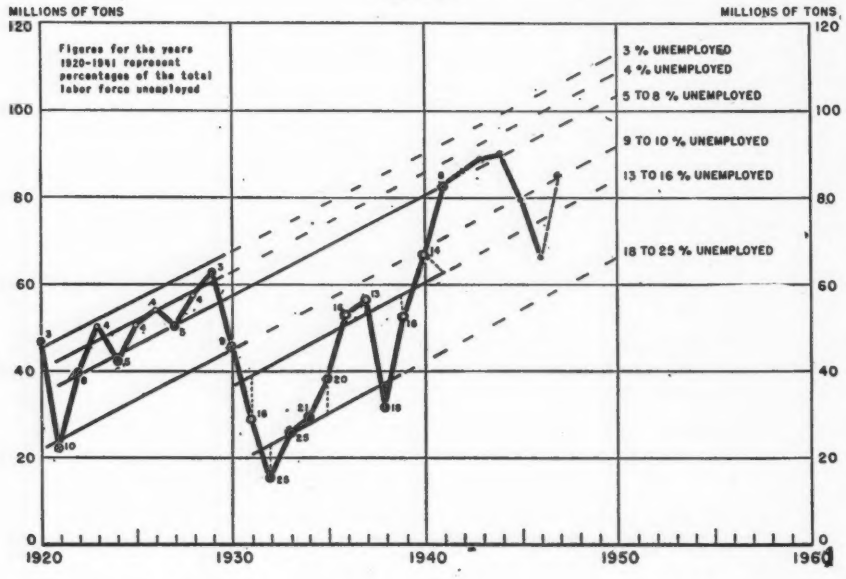

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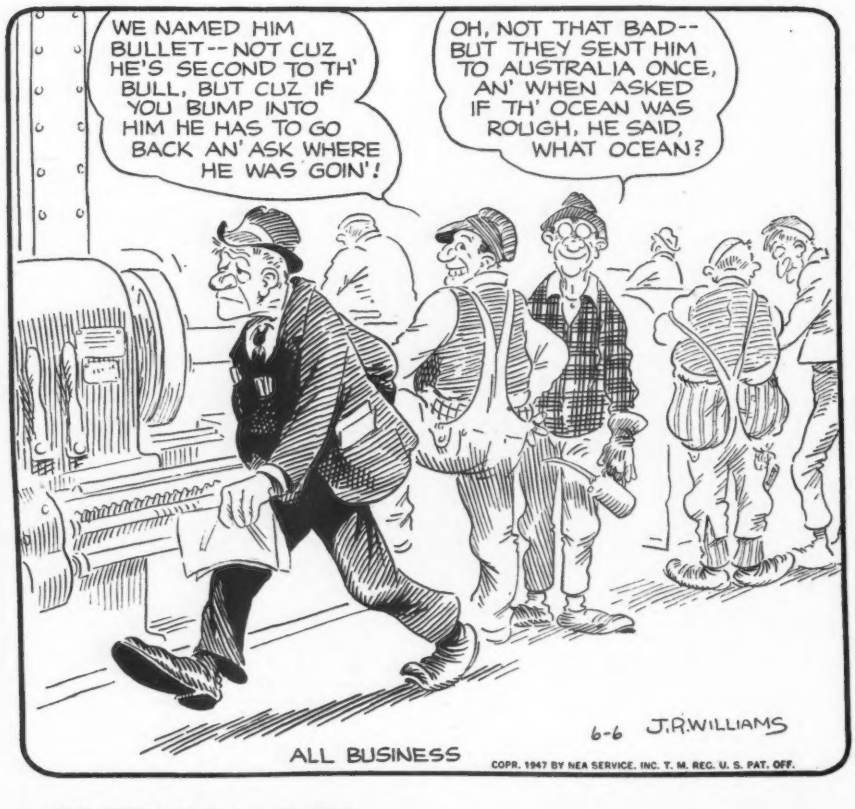
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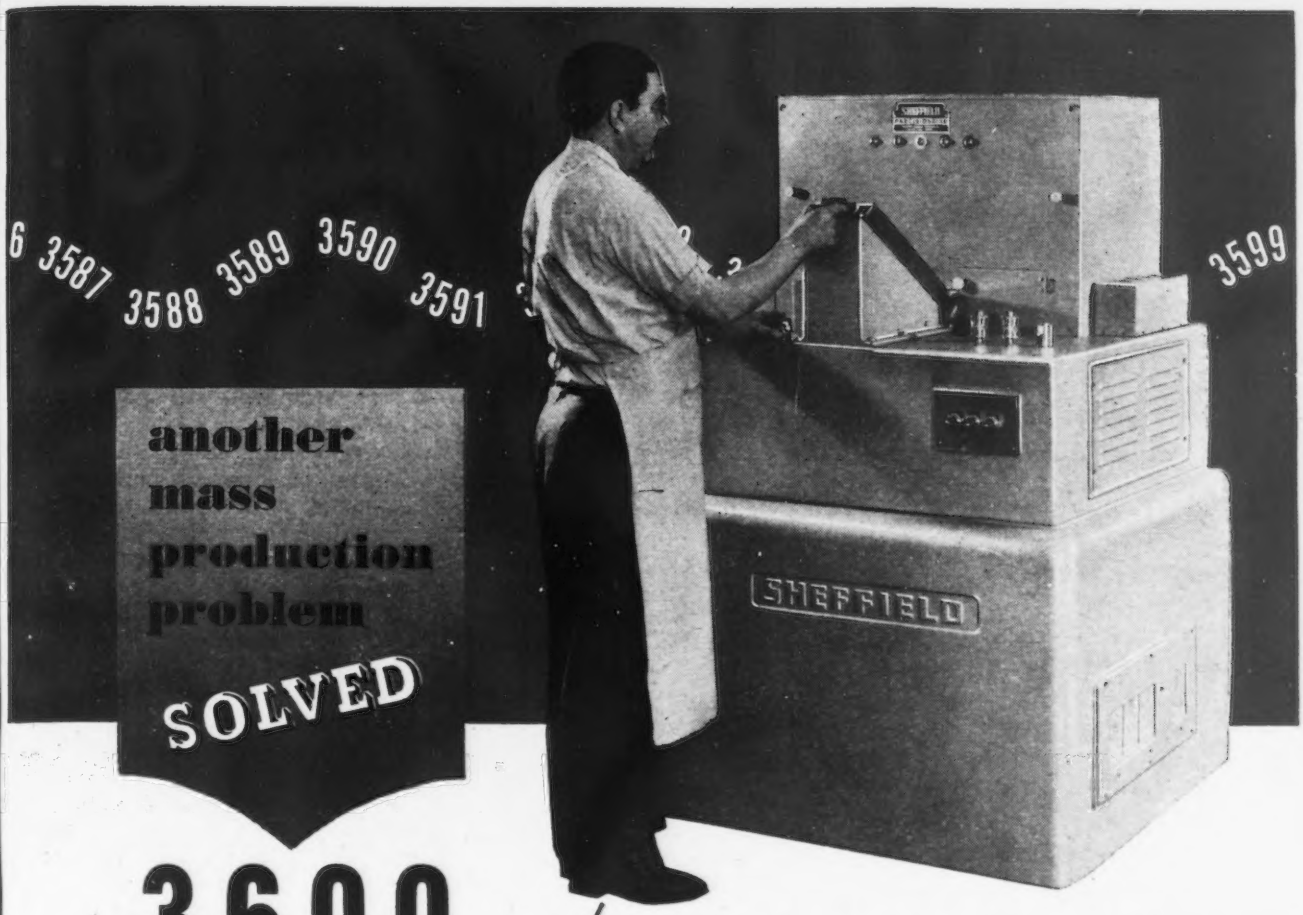
(CONTINUED ON PAGE 130)



another mass production problem SOLVED

3600 *pistons classified per hour*

Shock absorber pistons come by conveyor from the centerless grinders to this Sheffield "Airlectric" Automatic Gaging Machine for inspection and dimensional classification.

The operator merely feeds the pistons into a chute. The "Airlectric" then automatically segregates undersize and oversize units. At the same time, those which fall within tolerance limits are separated into five classifications for subsequent selective assembly—and at the rate of 3600 units per hour.

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the Sheffield corporation

Dayton 1, Ohio U. S. A.

Sheffield MASTER CRAFTSMEN

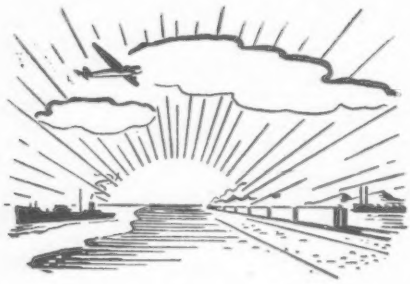
Standard Gages Shipped in 24 Hours

2580

West Coast . . .

ROBERT T. REINHARDT

• California industrial progress threatened by gas shortage . . . Los Angeles metalworking industries continue to show growth . . . Utah Kalunite plant back in hands of WAA.



SAN FRANCISCO — If the gas gage on the dashboard of the industrial machine of California is accurate, there is only enough fuel for 20 more years at the present rate of operation unless another source of supply is tapped, according to the California Manufacturers Assn.

Pointing out that California industry faces a serious fuel crisis, Alvin E. Hewitt, executive vice-president of the manufacturers group, declares that it is essential that a gas pipeline be installed from either the Colorado or Texas fields into northern California and that it must be done quickly unless industrial progress is to be stymied.

Primary steel producers and metalworking plants of the state are seriously concerned as they are large users of gas for fuel in open-hearth, heattreating furnaces, soaking pits and fabricating processes. All of the primary producers in the state with the exception of Kaiser Co., Inc., at Fontana use natural gas in their openhearths or soaking pits. In some instances this fuel is supplemented by oil.

Launching a drive for the purpose of interesting some private utility or corporation in laying the pipeline deemed necessary to prevent a gas shortage, the manufacturers association has formed a special 21-man committee on natural gas headed by George A. Cooper, president, Plastic Die & Tool Corp. of Los Angeles and made up of industrial executives from both the northern and southern parts of the state. Edwin Fleischmann of San Francisco has been retained as consulting engineer.

A shortage of gas, particularly for industrial uses, was foreseen by forward looking businessmen as long ago as 1939 when the seriousness of the situation was called to the attention of the California State Railroad Commission (now the Public Utilities Commission) and a few abortive steps toward conservation and developing new sources were taken.

An indication of what California industry faced occurred in December of 1945 when several hundred users of natural gas in the southern part of the state were cut off during an unusual cold snap. (THE IRON AGE, West Coast, Dec. 27, 1945.) At that time, only companies in the surplus gas categories were affected, but it was pointed out that the shut-offs showed the necessity for developing new sources.

The situation in southern California is being relieved by a pipeline from Texas to that area and is expected to start delivering this fall. This line was built at a cost of approximately $85 million.

The California Manufacturers Assn. has made no engineering recommendations as to the location of the pipeline nor as to the source which it may tap. Both Colorado and Texas have been mentioned as possible sources.

UNLESS the natural gas situation is relieved, industry will be forced to depend upon oil, but even this fuel is far from abundant and experts believe that oil will have to be imported by 1950 to meet domestic demands. It is estimated that imported oil will cost approximately $2.50 a barrel in comparison to the present local price of $1.45 to $1.50 per barrel. However, the present oil supply situation is not too good and the U. S. Navy has reported that it is getting only 60 pct of the amount of this fuel it would like to purchase in the California area.

Hearings before the California Public Utilities Commission are being held on the gas supply situation and considerable opposition is being organized to oppose the proposal that industrial gas users be cut 80 pct. Such conservation would result in important industries being capable of operating on this fuel for only a few hours per month.

Obviously, California, already admittedly handicapped by high wage rates and freight differentials, will prove even less alluring to prospective manufacturers knowing that they may face fuel shortages in their operations. Consequently, the campaign to bring more gas to this area is getting support of all industrial leaders and the hearing proposed before the Public Utilities Commission is certain to develop fireworks.

Southern California, which is to get the greatest benefit from the Texas-Blythe pipeline, will probably be in no position to be of material help to the northern area of the state. This mid-continent gas will be delivered up to a maximum of 305 million cu ft per day in 1951 and for the remaining 25 years' life of the contract. Roy A. Wehe, assistant director, Public Utilities Div., California Public Utilities Commission, reports that he understands that additional volumes of delivery, approaching 100 million cu ft per day, could be physically realized by increasing pressures providing authorization is secured and a contract for the gas made.

MR. WEHE presents the following statistics from the present status of reserves and ultimate prospective life of present supplies:

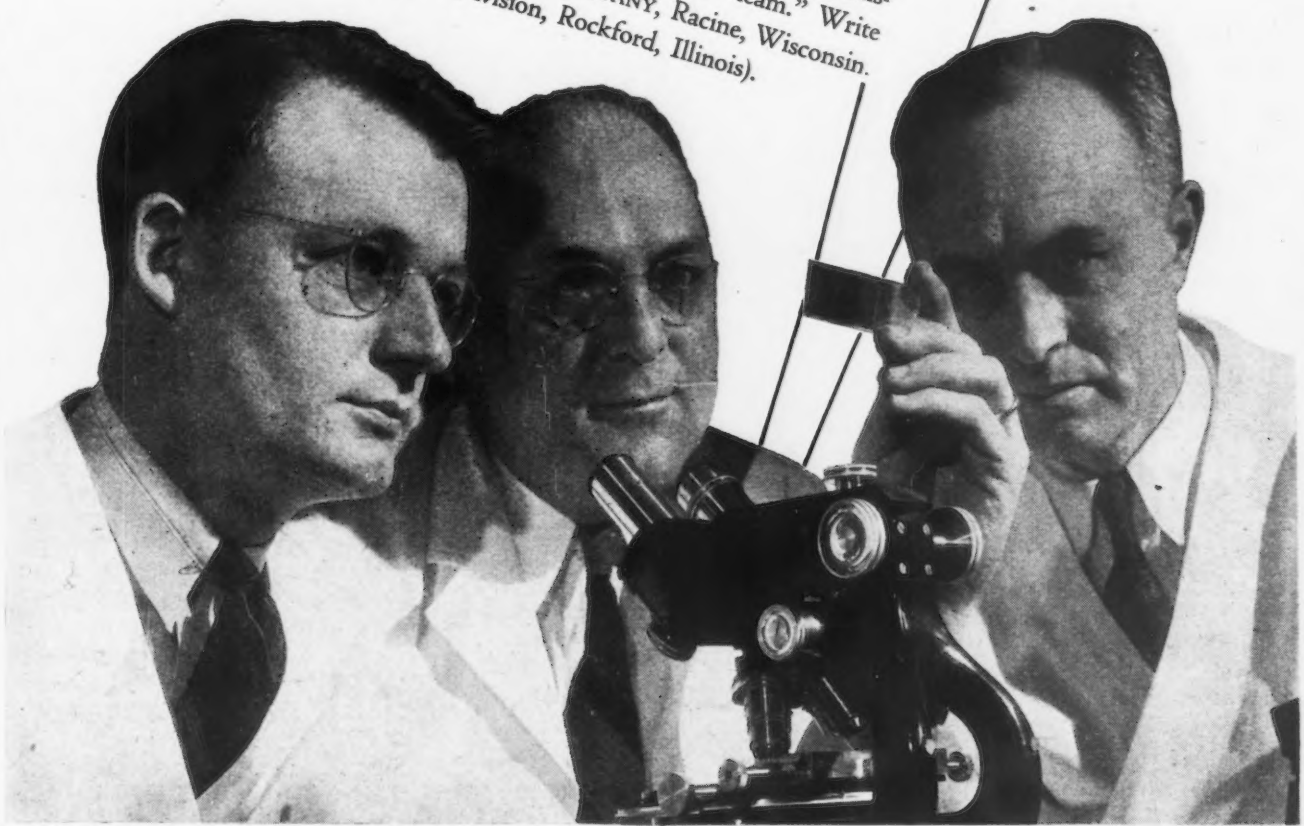
1946 Net Production Related to Estimated Gas Reserves as of Jan. 1, 1947
Millions of Cubic Feet

	Northern California	Southern California	State Total
Estimated Reserves	4,082,489	5,824,329	10,906,818
Net Production	224,274	290,359	514,633
Percent Production to Reserves (1)	4.41 pct	4.98 pct	4.72 pct
Reciprocal of Item (1) in Years	22.7	20.1	21.2

Men against Microbes

Pooling their rich backgrounds of knowledge, experience, perception, and research skill, a team of Purdue University veterinary scientists and technicians is patiently probing the bacteriological fog that obscures the cause and cure of brucellosis (undulant fever). Risking their lives, these men have made definite progress in their fight to conquer this costly disease.

In similar but less dramatic manner, the Twin Disc Clutch Company has pooled individual skills for many years...has worked toward a single goal...to improve the design, manufacture, and application of exactly the right Friction Clutch or Hydraulic Drive for every job. That's why, today, so many manufacturers of powered equipment rely on the impartial, fully qualified recommendations of Twin Disc Clutch Company engineers. When you have a problem concerning the control or transmission of power, refer it to the Twin Disc "team." Write the TWIN DISC CLUTCH COMPANY, Racine, Wisconsin. (Hydraulic Division, Rockford, Illinois).



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SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

Mr. Wehe points out that while the 22.7 years shown above is the reciprocal value, that it is probably erroneous to use this figure as representing the life of the reserves since no consideration is given to reductions in the rate of production of natural gas in fields undergoing pressure decline, nor is any consideration given to reduced deliveries to utilities, brought about by field pressure maintenance programs.

While still in the realm of conjecture and hope, some forward looking industrialists are optimistically of the opinion that within the next 10 years at most, some form of atomic energy will be produced to relieve this acute fuel shortage and perhaps revolutionize all forms of energy development. Already it is known that both the General Electric Co. and Westinghouse Electric Co. have made considerable advances in the production of atomic energy for industrial purposes, although neither organization is discussing it publicly as yet.

PRODUCTION at the Judson Steel Corp. in Emeryville, Calif., is expected to resume early this week as a settlement has been reported between 216 striking members of Steelworkers Local 1441 and the company which gives the union members increases in pay and other benefits in excess of the national pattern.

The plant was struck on May 12 after a 10 to 1 vote in favor of the strike. The dispute centered on overtime rates, vacations and other conditions as well as wage increases.

The local succeeded in getting a raise of 15¢ an hr, two weeks' vacation after 5 years with an additional day for each year over 12, and retroactive adjustments back to 1944, according to the latest information available.

One of the oldest steel producers in the state, having been founded in 1882, the company operates three basic open hearth furnaces of 30 ton capacity each and has an annual production of approximately 76,500 tons per year, which is rolled into bars.

Los Angeles — The metalworking industries have maintained a high rate of activity since the end of the war. Employment in the iron and steel industries in the Los Angeles area is more than one-third greater than in October 1945 and 82 pct more than in 1939. Iron and steel and their products, second largest manufacturing industry in the area, employed 25,500 as of February 1947, compared with 18,900 in October 1945 and an average of 14,000 workers in 1939, according to a report by Dr. John D. Gaffey, regional economist, U. S. Department of Commerce.

Nonelectrical machinery now has 19,000 production workers, an increase of almost 2½ times the prewar 1939 average of 8000 workers. Electrical machinery and equipment industries, with 7600 workers in this area, has an increased employment of over three times the 1939 level. Both of these industries have shown substantial growth in the past 18 months. Los Angeles has become the leading producer of oil well machinery and equipment and produces many other types of heavy and lighter machinery and equipment.

The war gave nonferrous metals industries in and around this area an enormous boost. This group, employing 8200 workers as of February 1947, shows nearly a 50 pct employment gain over October 1945 and is now more than double the prewar level of 3500. Employment has declined about 10 pct from the level of 6 months ago, however. It remains one of the principal industries here, but it now appears to be a period of consolidation of previous growth. The reconversion problems of nonferrous metals producers have proved to be greater than in most industries, Dr. Gaffey pointed out. Since the majority of the producers in this area are relatively new, they were forced to develop new products to survive. The competition of other areas is increasingly keen and many local firms are struggling hard to hold their own in the postwar national market, Gaffey went on.

Arizona likewise developed a considerable nonferrous metals industry during the war. The postwar problems and trends there are generally similar to those of southern California. Some recent decline in employment has also been experienced in this industry in Arizona.

Pacific Southwest Trends at a Glance
U. S. Dept. of Commerce, Field Service "Bulletin of Commerce," Vol. 1, No. 9

	April 1947	Comparison With 1940
Population ...	5,978,000	up 38 pct
Civilian Labor Force	2,474,000	up 38 pct
Income (1946)	$8,250,000,000	up 148 pct

With 4.2 pct of U. S. population and about the same proportion of the labor force, southern California and Arizona received 5 pct of national income in 1946.

SALT LAKE CITY—The deep split between marginal and nonmarginal producers of nonferrous metals over the premium price program, or subsidies, was again exposed at the recent convention of the Idaho Mining Assn. After protracted discussion which changed no minds, the resolutions committee recommended that no resolution be passed on the controversial subject, and the recommendation was followed.

The proposed resolution, representing the position of the anti-subsidy group, complained that the premium price plan served to obscure corrections necessary to stimulate production within the framework of private enterprise; that it imposes a needless expense of $100 million per year upon the taxpayers; that it opens the door to discrimination.

On the affirmative side, the resolution maintained that a free market will set prices at a level high enough to stimulate production.

* * *

Failure of the Emerald Mining Co. of Elko, Nev., to carry out the terms of its bid on the government-owned Kalunite plant in Salt Lake City has dropped that facility back into the lap of WAA. The Elko firm offered $920,000 in five equal installments for the facility, which was built at a cost of $5,600,000 to convert Utah alunite into alumina. But the bidder neither paid the first $184,000 installment by the May 26 deadline nor offered any proof of financial ability to meet the payments. The regional office has been directed to investigate and make a report on financial responsibility. If the report is adverse WAA may approach the other two bidders to see if they are disposed to raise their offers. Sterling Chemicals, Inc. of New York bid $355,000, and J. R. Simplot Co. of Caldwell, Idaho, bid $255,000. Both these firms indicated they were interested in converting the plant to the production of commercial fertilizers.

VICKERS helps achieve HYDRAULIC EQUIPMENT

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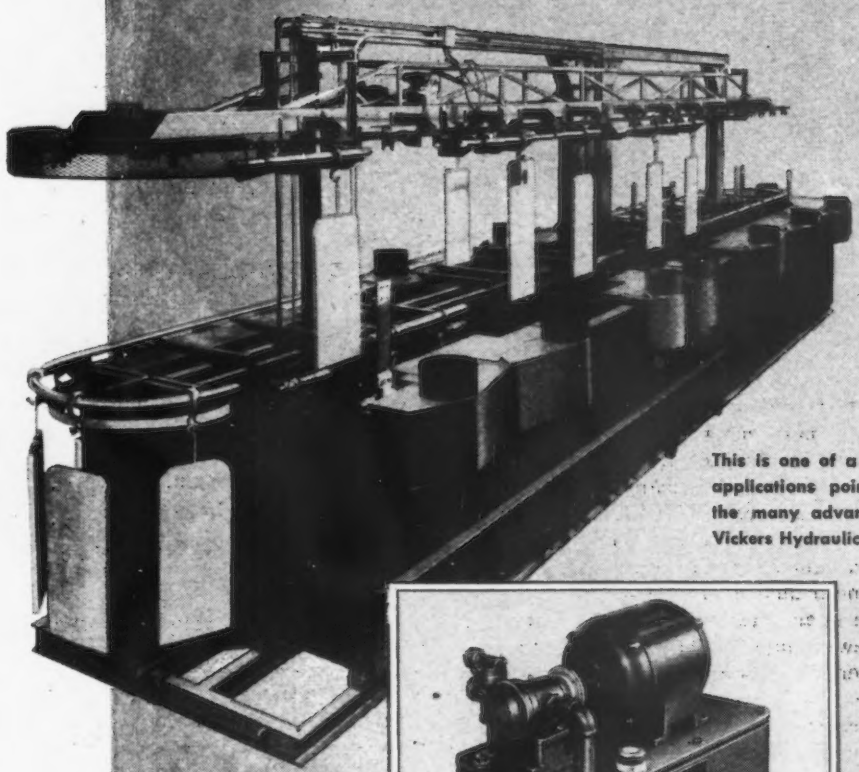
SPACE ECONOMY
UNIFORM QUALITY

IN *Udylite* AUTOMATIC PLATING MACHINE



This is one of a series of applications pointing out the many advantages of Vickers Hydraulic Controls.

Above: Elevated position for transfer from one tank to the next.

Vickers Hydraulic Power Unit.

his Udylite machine does a complete lating job automatically . . . taking ach part through seven tanks and a rying chamber . . . timing exactly the terval in the various solutions for eaning, plating and rinsing.

ach part (or rack of parts) is auto-atically lowered into each of the seven nks in turn—then lifted out and trans-rred to the next tank. This might be one with a multiple dip conveyor. But e conveyor slants permissible in wering and raising in that way re-uire extra tank length.

dylite made the machine far more mpact—saving 18″ to 24″ in the ngth of each tank—by using Vickers ydraulic Equipment to raise and lower e entire conveyor assembly at each ansfer. By this means, each piece (or ck) is lifted straight out of the tank, oved over the next tank and lowered raight down. This provides better eaning and more uniform plating—etter drainage and less contamination the solutions.

e Vickers Hydraulic Power Unit and Control Valves have any advantages for such applications: (1) proven depend-bility, (2) accurate control and precise timing, (3) flexibility of ntrol to suit varied production requirements, etc.

e versatile features of Vickers Hydraulic Equipment on this type of application, as on many other industrial installations, have made possible increased production, improved product quality, greater safety, and lessened physical demands upon labor while increasing its productivity. Vickers Application Engineers will gladly discuss your individual control problems.

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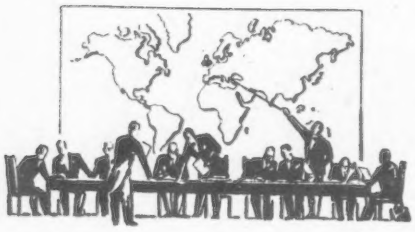
NGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

European Letter . . .

• French Socialists form part of a coalition government where Communist Party finds no place . . . Will excluded Communists' opposition hinder Socialists' progress?



LONDON—The French Socialists have entered a new stage in their career in consenting to form part of a coalition government in which the Communist Party no longer finds a place. Their reluctance and self-examination are some measures of the way the position has changed since the great prewar days of the Popular Front. Then, too, they governed without the Communists, even if with much greater self-confidence than success.

Since then they have lost their hold on working-class France, and the great industrial unions of today vote Communist. Their economic policies can succeed only if the Communists—while excluded from the government—nevertheless refrain from active opposition. This curious paradox has led many people to wonder where the present Socialist leadership wishes to take the party.

It is, indeed, one of the great questions of the day whether Socialists will interpret the act of governing without the Communists as synonymous with government against them.

No group of French politicians has played a more outstanding part in politics since the end of the war than Socialists. Few who were present will forget the sense of drama and achievement that invested the election of Mr. Auriol as President of the Republic in January. The tricolor unfurled upon the Fourth Republic as a Socialist Prime Minister led a Socialist president through the gates of the Elysée that had been locked for so long. It was almost a family occasion. Never had the party stood so high.

Four governments have ruled in France since General de Gaulle resigned; and three of them were led by Socialists. The presidency of the Constituent Assembly was held successively by Mr. Gouin and Mr. Auriol. A single-party government of 21 Socialist ministers was formed by Mr. Blum, and might well have outstayed its month of office if Blum had been younger or less shaken by German jailers. Mr. Ramadier, the present Prime Minister, presides over a cabinet which is predominantly Socialist.

The party's leaders have held every sort of office, have gone abroad to negotiate and sign important economic and political agreements, have often represented France. And they have done all this with a flourish and spate of oratory that recall the more gorgeous days of the Third Republic.

YET the appearance is misleading. Indisputably, the French Socialists are a declining force. The three general elections since the autumn of 1945 have shown a progressive loss of Socialist votes to the gain of both Communists and MRP (Progressive Catholics). The party now is by far behind both its rivals.

Declining prestige from the implication, or suspected implication, of Socialists in wine, food, and other scandals, would indicate that another general election, were one to be held this year, would leave the Socialists once again weaker than before. All too clearly, the party of 1947 lacks those qualities of dynamism and self-confidence which made it great, and which today, are the driving forces behind the other two big parties.

Inquiry into reasons for this decline would show that the weakness is not new. The *Section Française de l'Internationale Ouvrière*, as the party is officially called, suffered the same split in loyalties and doctrines as the other parties of the Second International. The fateful congress at Tours in 1921 hived off a majority who were to form the French Communist Party. Ever since then the Socialists have been fighting on two fronts a battle that nothing, probably, could have prevented them from losing.

For a brief moment the great days of the Popular front and the common fight against the Fascist leagues masked the truth of Socialist weakness; but the moment passed, and with the war the internal divisions which were sapping the party's strength were intensified to the point of disaster. At the first postwar congress in 1944, about 80 Socialist deputies were expelled from the party for having voted for Pétain, only 10 or 15 voting against.

BUT, far more serious than the split in the leadership, the party also lost a great part of its rank-and-file. The gradual inroads which the Communists had made into the Socialist voting power before the war became a great gap during the heroic days of the Resistance.

While Socialist veterans like Paul Faure were preaching pacifism before the German invaders, and trade union leaders like Belin were collaborating with Vichy, the Communists stood firmly and as one man for armed retaliation. This they linked to a broad program of social reform with which France might face the future hopefully and solvently.

By the end of the war the *clientèle* of the left-wing parties had significantly changed. The Socialists, incomparably weaker in numbers than in 1939, recouped their strength from the Radical petty-bourgeoisie; the masses of the working-class they lost to the Communists.

This telling shift in the electorate has played havoc with the doctrine, tactics, and organizational coherence of the party. They hold the balance between the Communists and the MRP, true enough, and have thus been able to secure leadership even in spite of their in-

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They found these advantages in drawing with Houghto-Draw:

NO LIMING... ONE PASS TO REDUCE .040"... LONGER DIE LIFE... BEST FINISH EVER OBTAINED

A steel company was dissatisfied with its former "liming" method of drawing hex and round bars, ¾" to 1¼", low carbon steel. Study of the procedure developed the following sequence: Pickle, Neutralize, Wash, Draw (2 parts water to 1 part Houghto-Draw). Bars are shipped without oiling, the drawing compound protecting against corrosion. Other advantages are listed above. What was done here can be done for your own drawing problems, if you contact E. F. HOUGHTON & CO., Philadelphia and all principal cities.

HOUGHTON'S

HOUGHTO-DRAW

feriority. But they no longer know what they are after.

A Socialist party is founded necessarily, and in the narrow sense of the word, on a class basis. The idea of class, of the struggle between classes, is both its *raison d'être* and its method of operation. Once this basis is lost the party's energies run into the sand and lose themselves in a confusion of words and meanings.

The 3½ million French electors who still vote for Socialist candidates may want social change, may feel opposed to what they understand by capitalism, may take pride in being "left wing republicans"; manifestly, they do not want socialism. They are people who used to vote Socialist-Radical—small shopkeepers, white-collar workers (the only unions in which the Socialists retain a majority are the clerical organizations of bank and postal clerks, and some others) together with a large number of schoolteachers and professional workers.

In these circumstances it is scarcely surprising that the party leadership has come to resemble something like a private *Interessengemeinschaft*, while the driving force behind the party's doctrines is now the negative hostility of anticommunism.

It is the Communists who have campaigned for national policies of wages and production, led the miners to remarkable efforts, withheld from nationwide strikes, bargained for higher wages and better living conditions, taken the initiative in demanding structural reforms such as the nationalization of key industries; it is the Socialists who, more than once, have frustrated and hampered these efforts in a vain attempt to recover their former supremacy.

With many of the Socialist leaders the hostility to communism has driven them far to the right, so far indeed that more than a few would probably be willing to throw in their lot with General de Gaulle—as, indeed, they did in 1945. The left wing of the party pull hard on the coat tails of the party's leaders, but with uncertain effect.

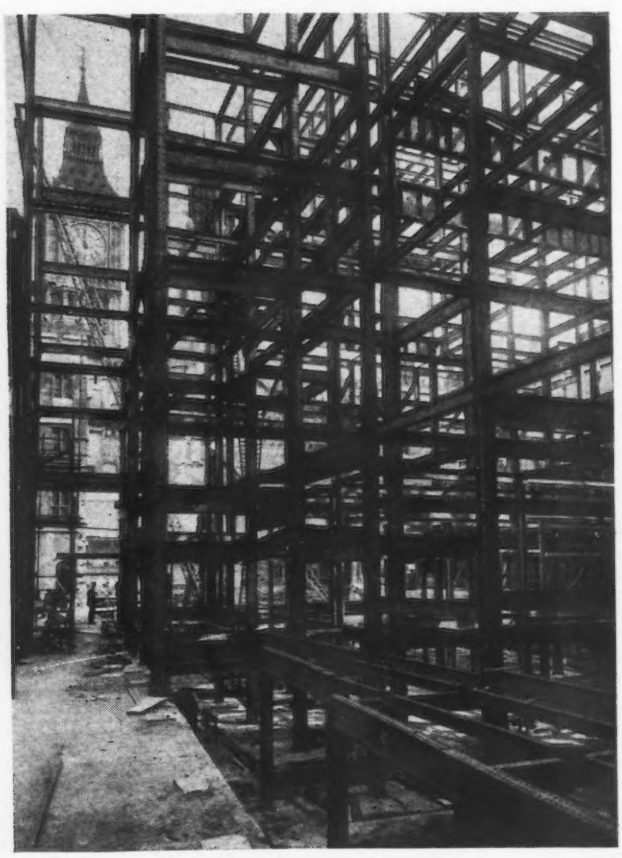
While Mr. Moutet, the Socialist Minister for Overseas Territories, proclaims his loyalty to the principles of the French Union, of a union of states freely associated with each other, his actions are acclaimed by the colonialists of the Right. Internal contradictions have become chronic.

It will be clear from this that the comparison of the French Socialists with the British Labor Party is open to a number of important reservations. Ideologically, perhaps, the two parties still stand for much of the same thing. Both are anticapitalist, both anticommunist.

But the composition of the two parties, clearly, is radically different. The Labor Party stands firmly on its trade union backing, is still a party of the working-class. The French Socialists have weak trade union backing (the last Congress of the *Confédération Générale du Travail*, held in Paris last April, showed that the Socialist minority commanded about three elevenths of the block votes).

It is conceivable that this balance of forces may change. If so, this will not be by a shift of the working-class electorate in France back to the Socialists, but by the formation of a new Popular Front in which Socialists and Communists would join forces.

For years now the French Communists have campaigned for a single left-wing party, the *Parti Ouvrier Français*, in which Socialists and Communists would sink their identity on a footing of equality. If that were to happen, the comparison with the British Labor Party would bear examination and might well bear the strain of a close alliance between the two countries.



BIG BEN WATCHES: *Structural steel rising on the site of the old House of Commons, wrecked during London's blitz. Big Ben, in the background, is almost hidden by the steel network.*

o o o

Says Freight Boost Will Hurt Business

Chicago

• • • **Injury to producers,** manufacturers and shippers in the Chicago area will result if railroads serving this territory put into effect proposed increases in less than carload freight rates, A. H. Schwietert, traffic manager of the Chicago Association of Commerce and Industry, declared at a meeting of the Eastern Traffic Executives Assn. on May 23.

Mr. Schwietert stated that unless there is a simultaneous increase in interterritorial rates, the proposed rates will place an undue burden on shippers in this area, while shippers in the South and West will receive an unreasonable and unlawful preference.

o o o

a Significant *Announcement...*

2 NEW

MURCHEY

Chasers and chaser holding blocks quickly replaced *without losing size adjustment*

The NEW MURCHEY "TRB" Rotating or the "TLB" Stationary Die Head, with extra chasers and blocks preset to exact location in the Murchey fixture, *takes the place of two or more complete tools.*

Down time is reduced to a minimum—replacement of chasers and holding blocks is usually made *without removing tool from the machine.*

Chasers of a given pitch may be used to cut any diameter thread within capacity of the head.

No special equipment is required for close-to-the shoulder threading.

Longer chaser life is assured. Chasers are merely cleaned up on cutting edge—do not have to be ground to a predetermined point when sharpened.

A joint statement
by *SHEFFIELD* and *MURCHEY:*

Present and prospective users of Murchey products are assured of

CONTINUED
product and sales service of the Murchey line of products

AVAILABILITY
of Murchey replacement parts

PROMPT SHIPMENT
of Murchey tools and chasers

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of Murchey products through research.

Contact your nearest MURCHEY REPRESENTATIVE on your current threading problems and ask for copy of new MURCHEY catalog—or write direct

MURCHEY MACHINE & TOOL CO.
Detroit 26, Mich.

MURCHEY

DIVISION OF THE SHEFFIELD CORP.
DAYTON 1, OHIO, U.S.A.

2698

Dear Editor:

COLD SHAPING OF STEEL

Sir:

We are very anxious to secure some additional information in regard to the German process . . . which makes possible the cold flowing of steel in dies under high working pressures with the aid of a lubricant which prevents metal fractures by aiding the metal to flow as desired. Can you give us any suggestions where we may find complete information about this process?

G. D. AIKENHEAD
Research Dept.
George P. Wagner Associates
New York

● Heintz Mfg. Co., Front St. & Olney Ave., Philadelphia 20, has issued a detailed preliminary report on this German process, entitled "Cold Shaping of Steel" and designated report PB-39371. Full information concerning its availability may be secured by writing Mr. Weber de Vore of that firm.—Ed.

MANAGEMENT PROBLEMS

Sir:

It has come to my attention that an article written by J. Watson Wilson in one of your recent issues is of immense interest. . . . I would greatly appreciate your sending me a copy of the current issue in which this article appears.

EDWARD S. FRIEND
Nordberg Mfg. Co.
Milwaukee

● Mr. Wilson wrote "A Psychologist Looks at Management Problems" which appeared in the Apr. 17 issue. Tear sheets are being forwarded to you.—Ed.

PRODUCT VIBRATION

Sir:

We would appreciate reprints on the article "Vibration Testing and Product Acceptability" by Harrison Johnston, appearing in the May 15 issue.

A. H. MAGGS
Engineer
Watervliet Arsenal
Watervliet, N. Y.

OIL-GAS FIRED CRUCIBLES

Sir:

. . . One of our customers is now melting brass in an oil-fired tilt-type furnace using a No. 225 crucible. The conversion to gas-fired equipment is contemplated, and the question has come up as to whether crucibles will require earlier replacement when gas-fired than oil-fired. If you have any information regarding the life of brass melting crucibles when gas or oil-fired, I would appreciate your sending it to me.

W. H. BARTHOLD, JR.
Sales Engineer
Central Illinois Light Co.
Peoria, Ill.

● Indications are that there will be little difference in the life of the crucible whether oil or gas-fired. However, since there are some variables to be considered, more specific information could best be obtained by consulting with whoever takes on the job of converting the furnace.—Ed.

PLASTIC ADHESIVE

Sir:

In your Nov. 7, 1946 issue in Newsfront, you mention a new plastic adhesive or cement that was used in tests made by Sonntag Scientific Corp. for the purpose of gluing metal aircraft parts together. We would appreciate the address of the company that makes this new plastic adhesive.

ANDREW PROHASKA
Methods Engineer
Scintilla Magneto Div.
Sidney, N. Y.

● The adhesives used in the test mentioned in Newsfront were Cycleweld, developed by Chrysler Corp., Detroit, and Redux, by Resinous Products Chemical Co., Philadelphia.—Ed.

CAST PLIERS

Sir:

Could you please put us in contact with a foundry who can produce a casting in the form of a plier that we need in a considerable quantity. It would have to be either a malleable or steel casting.

H. N. REISFELD
Hauser & Reisfeld
New York

● We are forwarding a list of foundries which may be able to furnish what you wish. With the foundry industry generally swamped with orders it may be necessary for you to submit your specifications to several companies.—Ed.

STEEL COMPANIES

Sir:

We will appreciate your letting us know if there is available a list of steel companies and what type of steels they manufacture . . .

W. W. PEACOCK
Sales Manager
Charles C. Lewis Co.
Springfield, Mass.

● The "Directory of Iron & Steel Works of the U. S. and Canada" published by the American Iron & Steel Institute, 350 Fifth Ave., N. Y., and "Directory of Iron and Steel Plants" published by Steel Publications, Inc., 108 Smithfield St., Pittsburgh 30, are lists of this kind.—Ed.

NONFERROUS SCRAP

Sir:

We will appreciate receiving all available information on the following subject which appeared in Newsfront of the Mar. 27 issue. "The use of inert gases such as nitrogen and argon in the distillation and separation of contaminating elements from nonferrous scrap has reached significant proportions. The technique permits recovery of copper from brass scrap and aluminum from practically worthless aluminum alloy scrap in an atmosphere entirely free from water vapor, carbon dioxide and carbon monoxide. Hydrogen absorption is held to a minimum."

J. A. REA
Supervisor of Process Service
Linde Air Products Co.
Indianapolis

● Further discussion of the subject is contained in our Apr. 3 issue, p. 134. The information was based on a paper presented by W. A. Darrah, president of Intercontinental Engineers, Inc., 176 W. Adams St., Chicago 3, at the American Gas Assn. sales conference on industrial and commercial gas, held in Boston. The association will forward to you a copy of Mr. Darrah's paper.—Ed.

FLAME HARDENING

Sir:

If still available we would like to receive two tear sheets of the article, "Flame Hardening Small Machine Parts," which appeared on p. 77 of the Feb. 7, 1946 issue.

C. M. GRIFFIN
Director of Research
Lodge & Shipley Co.
Cincinnati

GASOLINE FROM COAL

Sir:

Do you have extra tear sheets of an abstract appearing in the Mar. 27 issue, entitled "Pittsburgh Consolidation Coal Co. and Standard Oil Development Co. Start Program to Make Gasoline and Gas Fuel From Bituminous Coal?"

J. W. MALMQUIST
Technical Consultant
Field Service
U. S. Dept. of Commerce
Minneapolis

INVESTMENT CASTING

Sir:

In your Apr. 10 issue, in the article "Requirements for Setting Up a Precision Investment Casting Plant" you made reference to articles which had appeared in previous issues: "Precision Casting by Lost Wax Process," July 9, 1942; "Equipment and Material for Precision Casting," Nov. 9 and 16, 1944. We would appreciate your sending us these articles.

W. V. VIERING
Asst. Purchasing Agent
Torrington Co.
Torrington, Conn.

● Tear sheets of the articles have been mailed. The second one has been reprinted in our booklet, "Precision Casting, Lost Wax Process," which contains 12 articles on the subject, and sells for $1.—Ed.

QUALITY CONTROL METHODS

Sir:

Will you kindly forward three tear sheets of the article in the Apr. 10 issue, entitled "The Practical Aspect of Modern Quality Control Methods" by Clifford W. Kennedy.

GEORGE W. TOCKSTEIN
Hotpoint Inc.,
Chicago

T&W FORGINGS

MORE REASONS WHY T&W FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY

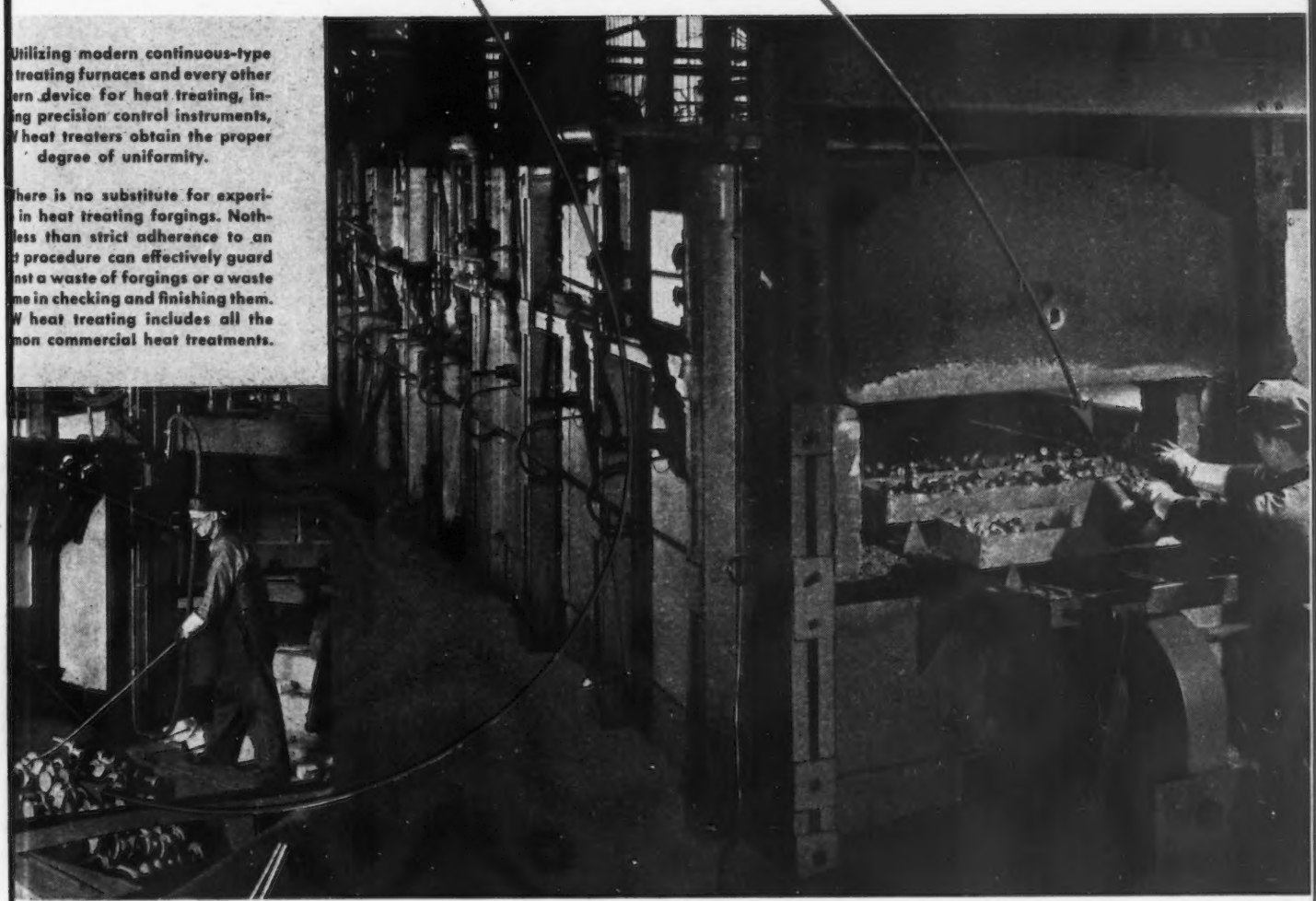
Adherence to prescribed procedures for forming and heat treating forgings usually obtains the desired specified results from all the common commercial heat treatments. Under the direct supervision of the T & W Chief Metallurgist, heat treating T & W forgings is a straight-forward production process that obtains accurate results in terms of hardness, toughness, ductility, and other physical properties with such regularity and certainty that a loss of either forgings or time seldom occurs. Ask a T & W Forging Engineer about how to save time in checking heat-treated forgings for uniformity.

A

B

Utilizing modern continuous-type treating furnaces and every other ern device for heat treating, ing precision control instruments, W heat treaters obtain the proper degree of uniformity.

There is no substitute for experi- in heat treating forgings. Noth- less than strict adherence to an t procedure can effectively guard inst a waste of forgings or a waste me in checking and finishing them. W heat treating includes all the mon commercial heat treatments.



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STEEL FORGING CORPORATION • ALLIANCE, OHIO

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PERSONALS

o o o

• **A. H. Milnes** has been appointed chief engineer, Steel Improvement & Forge Co., Cleveland. From 1940 to 1945 he was assigned to Steel Improvement & Forge Co. as resident technical representative in the U. S. for the Bristol Aeroplane Co., Ltd., Bristol, England, and was associated with the British Raw Materials Mission and the British Air Commission. Over a period of the past 9 years he has served the Bristol Aeroplane Co., Ltd., as production metallurgist before the war and with the development department after the war.

• **F. W. Marschner,** western sales manager, has been promoted to the position of executive assistant to the general manager, New Departure Div. of General Motors Corp., with offices at the main plant in Bristol, Conn.

• **Del Ostroot** has been named manager, foil sales, South Central Div., Reynolds Metals Co. with headquarters at St. Louis. Prior to his appointment, Mr. Ostroot served Reynolds as salesman in the South Central Div.

• **D. W. Tyrrell,** former vice-president and general manager, has been elected president of Ray-O-Vac Co., Madison, Wis., to succeed **W. W. Cargill,** who becomes chairman of the board. Mr. Tyrrell joined the company in 1920 as laboratory assistant and later was president of the Blake Mfg. Co., subsidiary at Clinton, Mass.

• **T. F. Brennan,** previously sales division manager in charge of nonfood containers in the Atlantic Div. of American Can Co., New York, has been appointed to the general sales department. He started with the company in 1910 and held various positions in the New York office until 1930 when he was transferred to Boston as New England sales manager. In 1935 he returned to New York as metropolitan district sales manager.

E. A. IRWIN (left), vice-president in charge of sales, and RAY H. SULLIVAN (right), vice-president in charge of manufacturing, E. W. Bliss Co.

• **E. A. Irwin,** general sales manager, has been elected vice-president in charge of sales, and **Ray H. Sullivan,** Brooklyn division manager, has been named vice-president in charge of manufacturing of the E. W. Bliss Co., Detroit. **Walter F. Rockwell,** president of the Timken-Detroit Axle Co., and **M. M. Burgess,** president of the Sheller Mfg. Corp., have been elected directors. **Lloyd C. Irving** has been made assistant treasurer. Prior to his appointment as general sales manager in 1946, Mr. Irwin had been the managing director of E. W. Bliss Co. of Canada, Ltd., for 5 years. He has been associated with the company for over 27 years. Mr. Sullivan joined the Bliss Co. last October as works manager of the Brooklyn plant. Before joining the Bliss Co., he was assistant general manager of the U. S. Cartridge Co. in charge of operations at the St. Louis ordnance plant.

• **H. C. Wallace** has been appointed manager of the Air Reduction Sales Co. Louisville district, succeeding **R. S. Moore,** recently deceased. Mr. Wallace started with Air Reduction in 1929 and spent all 18 years in the Louisville district.

• **Thomas H. Beacom** has been elected to the Stewart-Warner Corp. board of directors, Chicago. Vice-president in charge of trust department of the First National Bank of Chicago, he fills the vacancy caused by the retirement of **Robert J. Dunham.**

• **Carl B. Pollock,** manager of the Brackenridge, Pa., plant of the Allegheny-Ludlum Steel Corp., has been appointed production manager of the company. Mr. Pollock will serve as assistant to the production head, and will correlate the production of all company plant and manufacturing facilities. He also will have general supervision of scheduling production operations, and will be in charge of customer relations from a standpoint of production. He is succeeded as manager of the Brackenridge plant by **George W. Evans,** veteran employee who had been assistant plant manager. Mr. Evans has been associated with the company since 1909. Since that time, he has worked virtually in every department of the plant, working up to assistant plant manager in 1944.

• **Charles H. Buford,** former executive vice-president, has been elected president of the Chicago, Milwaukee, St. Paul & Pacific R.R., to succeed **Henry A. Scandrett,** who has been president since 1928.

• **Dr. Howard S. Turner** has been appointed assistant director of the research and development division for Pittsburgh Consolidation Coal Co., with headquarters at the company's research center at Library, Pa. In accepting this position, Dr. Turner resigned from the duPont Co., Wilmington, Del., where he had been employed for 11 years in research and development work.

• **Ivan V. Wilson** has been appointed assistant director of research for the Merrimac Div. of Monsanto Chemical Co., Boston. Mr. Wilson was formerly manager of the coating sales development department and will be in charge of all research and application work connected with the development of new and improved types of coatings. Mr. Wilson has been associated with Monsanto since 1927. **J. M. Graham, Jr.** has been appointed manager of the process section of the general engineering department, Monsanto Chemical Co., St. Louis. **H. T. Gammon** has returned to his former post as manager of the project analysis section of the company. Until his new appointment, Mr. Graham was assistant director of the general development department. He became associated with Monsanto in 1934 as a junior research chemist.

• **Edward J. Helline** has been appointed general sales manager of the Reliance Div. of the Eaton Mfg. Co., Massillon, Ohio. Mr. Helline has been with the company 28 years. For the past 3 years he has been in charge of snap ring sales engineering and production.

• **Reese B. Lloyd** has been appointed manager of the western plants of Rheem Mfg. Co. He will make his headquarters in Los Angeles. For the past year Mr. Lloyd has been manager of the larger of the company's two Chicago plants. He joined Rheem in 1944.

• **William M. Shipley** has been appointed to the position of eastern regional manager, Crosley Div., Avco Mfg. Corp., Cincinnati. He returns to Crosley after an absence of 6 years, during which time he served as vice-president of Thomas W. Berger, Inc.

• **Thomas G. Hart** has been appointed general sales manager of the Whiton Machine Co., New London, Conn. Formerly employed in the same capacity at the Terry Steam Turbine Co., Mr. Hart's new duties will cover sales direction of the various Whiton products.

CHARLES J. HARDY, JR., president, American Car & Foundry Co.

• **Charles J. Hardy, Jr.,** who heretofore had served as executive vice-president of the American Car & Foundry Co., New York, has been elected to the presidency, succeeding **F. A. Stevenson,** who has resigned. Mr. Stevenson had been associated with ACF for more than 40 years in various capacities.

• **Blair F. Claybaugh,** founder and head of the securities brokerage concern of Blair F. Claybaugh Co., Harrisburg, Pa., has been elected a director of the Sterling Engine Co. of Buffalo.

• **Dennis J. Crowley** has been named special sales representative of the Pratt & Letchworth Co. of Buffalo. He formerly was with the steel casting division of the American Radiator & Standard Sanitary Corp.

• **A. Nelson Fountain** has been appointed superintendent of the Buffalo Dry Dock Div. of the American Shipbuilding Co., to succeed **Robert P. Steel,** resigned. Mr. Fountain has been superintendent of the Great Lakes Engineering Co. for the last 4 years.

• **John J. Lee,** general manager of the Buffalo plant of the Twin Coach Co. and vice-president in charge of production, and **H. L. F. Kreger,** Cleveland attorney, have been elected to the company's board of directors.

• **B. C. Franklin** has been elected president of the Couch-Uthe Co., Elyria, Ohio. He retired as president, Western Automatic Machine Screw Co., a year ago after 36 years with the company.

• **H. B. Walters** has been appointed works manager of the Allis-Chalmers Mfg. Co.'s Boston works. Mr. Walters started in the company's shipping department in 1922. He has worked in all the manufacturing departments at the Pittsburgh works and at the time of his promotion to Boston, Mr. Walters was general foreman and assistant works manager of the Manchester plant of the company's Pittsburgh works.

• **J. I. Geisinger** has been promoted to the position of manager of field and experimental engineering of Samuel Moore & Co., Kent, Ohio. He was formerly factory manager of the Kent transportation products manufacturing firm. **Harry Ford** has been promoted to factory manager of Samuel Moore & Co.'s plant in Kent. He joined Samuel Moore & Co. after the end of the war. Prior to his army service he was associated with the Holland Furnace Co.

• **Robert G. Cady** has been appointed manager of the materials handling division of the Ajax Flexible Coupling Co., Inc., Westfield, N. Y.

• **E. W. Jackson** has been appointed director of parts and service of the Caterpillar Tractor Co., Peoria, Ill. Mr. Jackson has been general parts manager at Caterpillar since 1944. He joined the company in 1929 as a member of the research engineering staff. **M. T. Deames** has been promoted from assistant general parts manager to succeed Mr. Jackson. Mr. Deames joined the company in 1929 as a stockman in the parts storeroom. In 1944 he took charge of merchandising activities in the eastern division and the manufacturers' division, a position he held until 1945 when he was promoted to assistant general parts manager in charge of all distributors, dealer and customer contact and merchandising activities of the department.

D. W. THOMAS (left) and JOHN E. TIMBERLAKE (right), whose appointments as assistant general managers of sales, Jones & Laughlin Steel Corp., were announced in the May 29 issue.

• **Albert A. Sterling, Jr.,** has been appointed district engineer with headquarters in Houston for the J. A. Zurn Mfg. Co., Erie, Pa. Mr. Sterling was formerly affiliated with the Brance-Krachy Co. as sales engineer.

• **J. C. Peirce** has joined the Pangborn Corp. of Hagerstown, Md., to specialize in the application and development of the Pangborn hydro-sand blast and core knockout installations. For the past 9 years he was sales manager and chief foundry engineer of the Hydro Blast Corp. of Chicago. Prior to that he was associated with the Fort Pitt Steel Casting Corp. and Truscon Steel.

• **William F. Hosford** has resigned as director and vice-president in charge of operations for the Western Electric Co., New York. Mr. Hosford's resignation becomes effective May 31 and will coincide with his retirement after nearly 47 years of service with the company. **Stanley Bracken,** vice-president in charge of manufacture, has been elected to the post of executive vice-president. **H. C. Beal,** engineer of manufacture, has been elected director and vice-president to succeed Mr. Bracken. **F. J. Feely,** who continues as manager of Western Electric's Buffalo shops and electronics shops, becomes engineer of manufacture in addition to his other duties.

• **Thomas L. McCombs** has been appointed district sales representative in Rochester and surrounding area for Fort Duquesne Steel Co., Pittsburgh. Until recently, Mr. McCombs served as manager of the Rochester warehouse of Follansbee Steel Corp., Pittsburgh.

• **Robert H. Taylor,** formerly sales manager, has been made vice-president in charge of sales of the Florence Stove Co. His headquarters will be in Gardner, Mass.

• **Errol L. Buker** has been made district manager of the Indian Motocycle Co., Springfield, Mass., for New York, New Jersey and Pennsylvania.

• **Albert C. Beeson** has been named director of industrial relations for Food Machinery Corp. with headquarters at San Jose, Calif. He succeeds **Glenn A. Bowers.** Prior to the acceptance of his post with Food Machinery Corp, Mr. Beeson was in charge of industrial relations for the National Union Radio Corp.

• **Donald E. Williamson** has been appointed to the research and development department of Baird Associates, Inc., Cambridge, Mass. Mr. Williamson had been working with Lincoln Park Industries, Inc., where he was engaged in developments related to precision gaging.

• **Marion D. Austin** has been appointed assistant to Lester D. Bigelow in the Chicago office to assist in supervision of the field organization of the Hewitt Rubber Div., Hewitt-Robins, Inc. Mr. Austin has spent 13 years in industrial rubber goods sales, the last 3 serving as a district manager in Indianapolis.

• **Jay E. Miller** has been appointed advertising and sales promotion manager of the associated tire and accessory lines division of the B. F. Goodrich Co., Akron, Ohio. Mr. Miller had been advertising and sales promotion manager of the company's industrial products sales division since 1943.

• **Mark J. Millard,** a partner of Carl M. Loeb, Rhoades & Co., has been elected a director of Bell Aircraft Corp., Buffalo. He succeeds **Robert J. Woods,** who has resigned from the board. Mr. Woods, however, will continue his association with Bell as engineering consultant.

OBITUARY...

• **Albert W. Henn,** formerly president of National Acme Co., Cleveland, died recently.

• **Robert M. Liversidge,** purchasing agent for Lehigh Coal & Navigation Co., Philadelphia, and affiliated companies, died May 19.

• **Martin D. Hubbard** died on Mar. 22. He was the founder of the M. D. Hubbard Spring Co., Pontiac, Mich.

• **Thomas S. Hemenway,** 65, founder and president of the Metal & Alloy Specialties Co. of Buffalo and president of the National Nonferrous Foundrymen's Assn., died May 25.

• **Anthony Arth,** 76, president and founder, American Brass Mfg. Co., died May 21. He retired a year ago.

• **David C. Williams,** 50, a salesman for the Youngstown Sheet & Tube Co. in the Buffalo district since 1926, died May 21. He had been with the company almost 35 years.

SMALLER THAN A *Thumbnail*

PHOTOGRAPH Courtesy Westinghouse Electric Corporation

CHECKING a thread gage smaller than a thumbnail is simple when a Jones & Lamson Optical Comparator is used. The enlarged shadow of the gage projected upon the screen allows its contours to be examined for absolute accuracy, quickly and easily.

Jones & Lamson Optical Comparators provide a rapid and extremely accurate method for inspecting even the most complex forms.

Our engineers are inspection specialists, their knowledge of holding fixtures, handling methods and suitable Comparator equipment has saved thousands of dollars in manufacturing plants throughout the country. Call, write or wire for their service today.

Beyond a SHADOW of a doubt

Probably a Jones & Lamson Optical Comparator could effect comparable savings for you. Write for our book, "Beyond a Shadow of a Doubt." Or, better still, ask for one of our inspection engineers to call and discuss your inspection problems.

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

J&L

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies

Industrial News Summary...

- **Consumers Support Gray Markets**
- **Supply-Demand Relation Is Factor**
- **Steel Rate Up 1 Point to 97.5 Pct**

AS LONG as the normal source of supply to many manufacturers of finished consumer goods is insufficient to support the high operating rate at those plants, it can be expected that gray market steel will be purchased to meet current production schedules. This process has been going on for some time and current hearings in Washington are only bringing to light what has been common knowledge in the trade for more than a year.

At no time has the total tonnage of steel in the previous black or current gray market constituted a substantial proportion of total steel shipments. Practically all sales have been individual ones and have involved 1 to 10 carloads on each transaction. Prices on flat-rolled material have ranged from $175 a ton to as high as $300 a ton. In the past several months the going price in the gray market has dropped from around 15¢ a lb to as low as 7¢ a lb.

In extreme emergency cases where a manufacturer needs only a small amount of steel to complete a production schedule and maintain his working force he will even today pay as high as $250 a ton for cold-rolled sheets or strip. In another instance "distress" gray market steel may be sold in the same week at almost $100 a ton less. There is no regular pattern to the prices involved in present transactions—they depend on the individual circumstances of the customer seeking the steel.

AS the overall supply of steel increases and as the number of offers of gray market steel expand, premium prices will drop towards the regular normal mill quotations. This trend is already in motion. Overpriced steel markets are supported entirely by demand from manufacturers who will pay almost any price to maintain their working force in order to turn unfilled orders into actual deliveries as rapidly as possible. Many manufacturers are afraid that if they do not complete and ship their backlogs at an early date their competitors will, and cancellations will become more prevalent.

Sources of gray market steel are: Redirected export tonnage; steel sold by consumers whose quotas with the mills have given them more material than they actually needed; and finally a concerted drive by some steel consumers to get rid of their unbalanced or obsolete inventories at prices higher than mill quotations. It is a physical impossibility for steel mills to police the final disposition of steel going to ther regular customers. The so-called quota system is one of the fairest ways of distributing the current large steel production.

In a special survey and investigation THE IRON AGE has been able to find no evidence that steel companies were involved in gray market transactions. Wherever it has come to their attention that bona fide orders were being redirected to persons other than the regular customer, immediate action has been taken. In practically all gray market transactions, however, it is the persons second, third and fourth removed from the steel companies who peddle the material at the premium prices. Stories involving "great" tonnages have been found to be nothing but rumors or a geometrical expansion of one or two small sales.

As long as current steel demand continues well above the supply no changes can be expected in the official published steel quotations. A stronger scrap market with slightly higher prices in some areas gives further support to this contention. Most steel consumers whose knowledge of steel markets goes back many years see no change in the price of steel until supply outruns demand and some mills become "hungry for business." The chances of price concessions at that time depend upon whether any steel company can afford to step in and take business at less than the market price in the face of continued high wage and material costs. A strong union in the steel industry eliminates any possibility of lower wage rates.

DESPITE poorer quality scrap and the usual production difficulties when operating at a higher level, the steel industry this week forced its ingot rate up to a new peacetime peak of 97.5 pct of rated capacity, up one point from last week. Whether or not this high level can be maintained is problematical, but unless a coal strike develops in July, steel output will remain above 95 pct for some months to come.

Showing further signs of stabilization, the scrap market was stronger this week at most major consuming areas. Rises at Philadelphia and Chicago caused THE IRON AGE steel scrap composite price to advance to $31.17 per gross ton, up 75¢ a ton from last week. Steelmakers in the Chicago district have been complaining about the poor quality of scrap, even though admitting that shipments have been heavier recently. Normal fluctuations are expected in the market from week to week as buyers test current prices.

THE most substantial test of scrap prices has occurred over the past 10 days in Pittsburgh. Several thousand tons purchased at $32.50 last week set the market quotation there at $32 to $32.50 per gross ton for No. 1 heavy melting steel. The same level exists this week despite the fact that one large consumer was able to purchase only about 1000 tons at $30 a gross ton. This sale was not considered as influencing the market in view of the prices paid by other consumers as well as the difficulty experienced by brokers in covering their orders.

In some circles the indefinite postponement of coal wage negotiations has not changed the belief that the country may escape a mine tieup this year. If a strike should occur many steel companies will be forced to curtail blast furnace operations because of the short supply of high-grade metallurgical coke. Shutdowns in the industry, however, would not be uniform if the mines are closed—some companies have several weeks' supply of coal and coke on the ground.

• **NATIONAL INCOME**—Income payments to individuals during the first quarter of 1947 were at an annual rate of $177 billion or 7 pct above the record total of $165 billion last year, according to Commerce Dept. reports.

• **RESTORED NETHERLANDS MILL**—The Walserij West rolling mill of Velsen, The Netherlands, which was dismantled and shipped to the Hermann Goering Werke during the war has been restored and put into operation in less than a year. The mill went into operation on May 16. The mill in its present form has a capacity of about 170,000 tons of plates per year, but at present it will operate on one shift only at an annual rate of about 60,000 tons. The annual plate consumption of The Netherlands is estimated at 200,000 tons, and imports must continue, but some reduction in foreign orders is expected as a result of the restoration of the mill.

• **MORE CAR FIGURES**—Passenger car and commercial vehicle registrations in 1946 exceeded the 1945 total by approximately 3,300,000, according to figures compiled by the Public Roads Administration from reports of state authorities. Reports show that 33,945,817 motor vehicles were registered during the past year, compared with 30,638,429 in 1945 and 34,472,145 in 1941.

• **MACHINERY PRICES**—A tapering off in the upward movement of prices in the general machinery and equipment field may be indicated in the latest statistics released by the Bureau of Labor Statistics. This shows that while the April 1947 prices were 21 pct above a year ago and are the equivalent of 26 pct above prewar quotations, yet the composite prices rose but 1.3 pct for the first quarter 1947. Prices for a number of products remained stable or declined slightly during the period. Small decreased quotations were noted in industrial heat treating furnaces and gasoline and diesel engines; at the same time slight increases were registered in power transmission equipment and in gas welding and cutting equipment. There was no change in the prices for cutting tools and machine tool attachments and industrial oil burners.

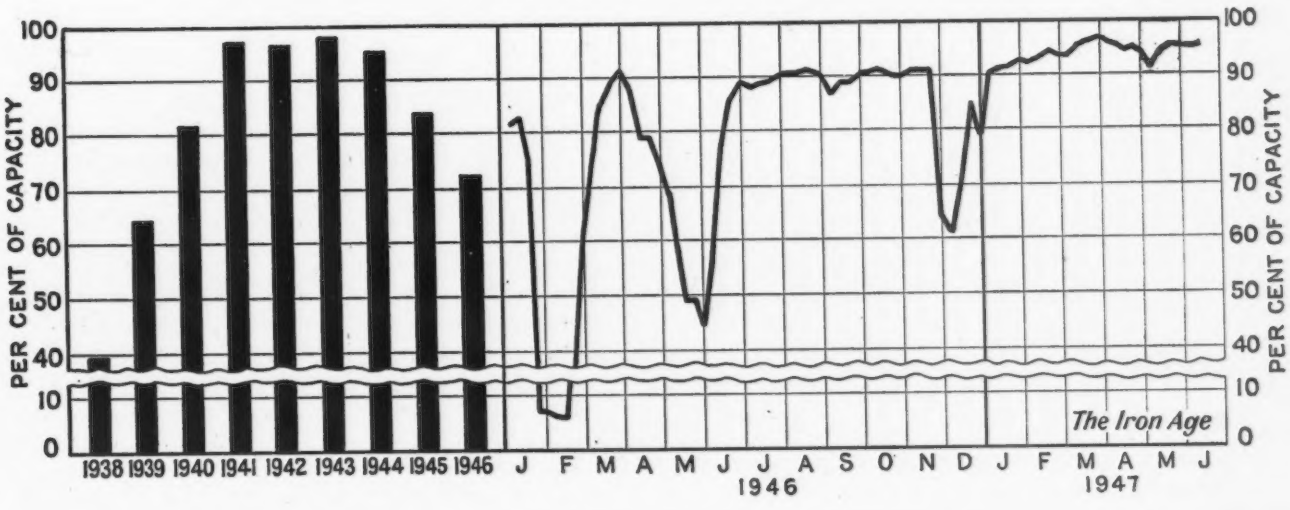
• **NAILS FOR SALE**—More than 4000 kgs of nails and a small quantity of plumbing fixtures will be offered for sale by the Chicago region of the WAA to building HH and MM certifiers June 13 through July 2. Additional equipment to be placed on sale at fixed prices includes faucets, drains, traps, sinks, shower valves, water tanks, hinges, and other miscellaneous items. The minimum purchase is $50. Catalog No. CG 19-1219 listing this equipment may be obtained from WAA Customer Service Centers in Chicago and Milwaukee.

• **GEAR SALES**—Members of the American Gear Manufacturers Assn. report an increase in volume of sales for April 1947 as compared with March 1947 of 11.3 pct. This report does not include turbine or propulsion gearing. The index figure for April 1947 was 424.

• **THE WIRE MARKET**—The demand for wire products has slowed up except for telephone wire, strand, road and pipe mesh. The demand for building mesh has also slowed down, probably because of weather, high building costs and strikes in the building trade. Considerable attention has been given deliveries of fencing material, an item in which there is usually very little interest during the summer months. Farm planting, it is reported, has been seriously delayed by excessive rainfall and this may account in part for the present situation. The need for bale ties, baling wire, barbed wire and steel posts continues unusually strong. Some nail manufacturers have apparently seen fit to reduce their production rate which would indicate that the nail supply situation is somewhat improved.

• **CHICAGO BUSINESS**—The Chicago Assn. of Commerce & Industry reports that the indexes of Chicago business activity for April were generally lower than in March and in some instances were below the levels of April 1946. Building and construction continued to lag, and railway express shipments and loadings of less than carload merchandise cars also showed declines in the month-to-month and year-to-year comparisons.

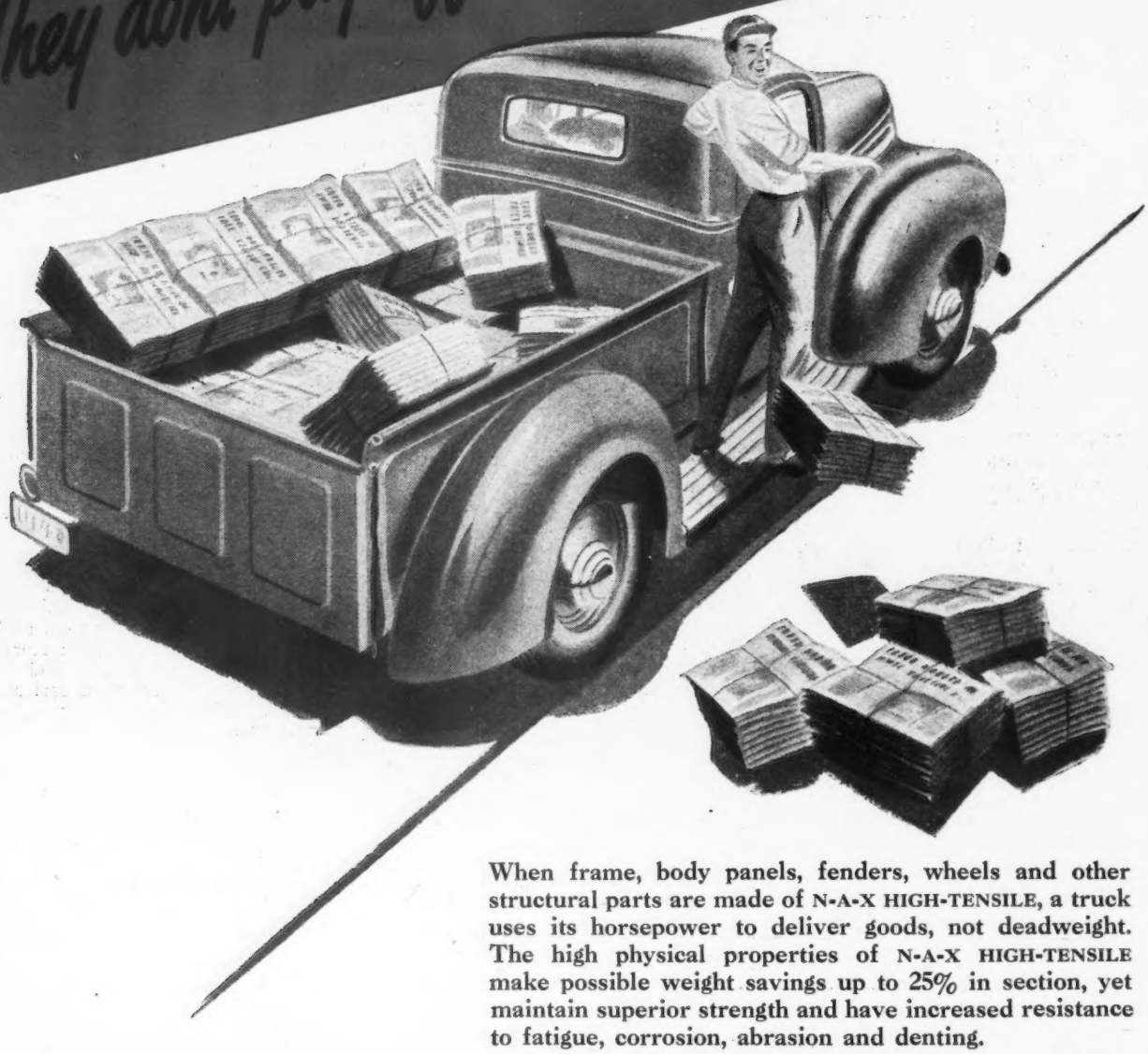
Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 27.....	105.0	96.0	94.0*	94.5	97.5	102.0	90.0	99.0	101.0*	107.0	98.0	61.5	97.0	96.5
June 3.....	105.0	96.0	92.0	94.5	100.0	102.0	100.0	99.0	101.0	105.0	98.0	82.0	108.0	97.5

* Revised.

They don't pay off on DEADWEIGHT



When frame, body panels, fenders, wheels and other structural parts are made of N-A-X HIGH-TENSILE, a truck uses its horsepower to deliver goods, not deadweight. The high physical properties of N-A-X HIGH-TENSILE make possible weight savings up to 25% in section, yet maintain superior strength and have increased resistance to fatigue, corrosion, abrasion and denting.

On the job, the savings in pounds mean a savings in dollars. Gasoline economy is improved. Maintenance costs are reduced. Life factor is increased.

If you make a product that moves, it will move more efficiently and economically through the application of N-A-X HIGH-TENSILE. Good formability, excellent weldability and fine surface texture for finishing make N-A-X HIGH-TENSILE a great steel to work with, too.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
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HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Senate Group Believes "Gray Market" Bigger Than First Assumed

Washington

• • • **Although the hearings** now underway by the steel subcommittee of the Senate Small Business Committee will not be brought to a close for several weeks, in the light of new developments, the committee staff is quietly compiling a list of key personnel within the steel industry whom it will call as final witnesses.

Two factors contribute to the prolonging of the hearings. One is that the committee is more firmly convinced than ever that the scope of the so-called grey market is much greater than was at first believed. A steel executive told the subcommittee that he did not believe more than 2 pct of total rolled tonnage is involved and a spokesman for the warehouse industry said that it may be as much as 5 pct; the committee believes it may be even more widespread than that.

The second factor is that the Senate group is preparing to extend its investigation to the West Coast from which an ever-increasing stream of complaints has been received since the hearing opened —and adding to the conviction of the committee that these activities are widespread. Typical of the complaints is one that came from a refrigeration firm declaring that Eastern gray market prices are so low as to be considered quotations on the West Coast.

"$200 sheet steel on the West Coast would be considered very legitimate from the only sources that can supply any quantity of sheet steel," the wire said in part. "Out here wastes and rejects sell for $240 a ton. Anything passable, from $260 to $300. Poor grade galvanized sells for $340 per ton."

So far, the subcommittee has found no evidence that the steel industry is in any way responsible for the bouncing open market prices, that it is not living up to its agreements, or that it is not doing its best to supply its quota customers as equitably as possible with the available production.

Nevertheless, witnesses continue to take the stand to declare that while this apparently is true, and in some cases non-quota customers sometimes get shipments,

Will Call Steel Executives, Extend Its Investigation To the West Coast

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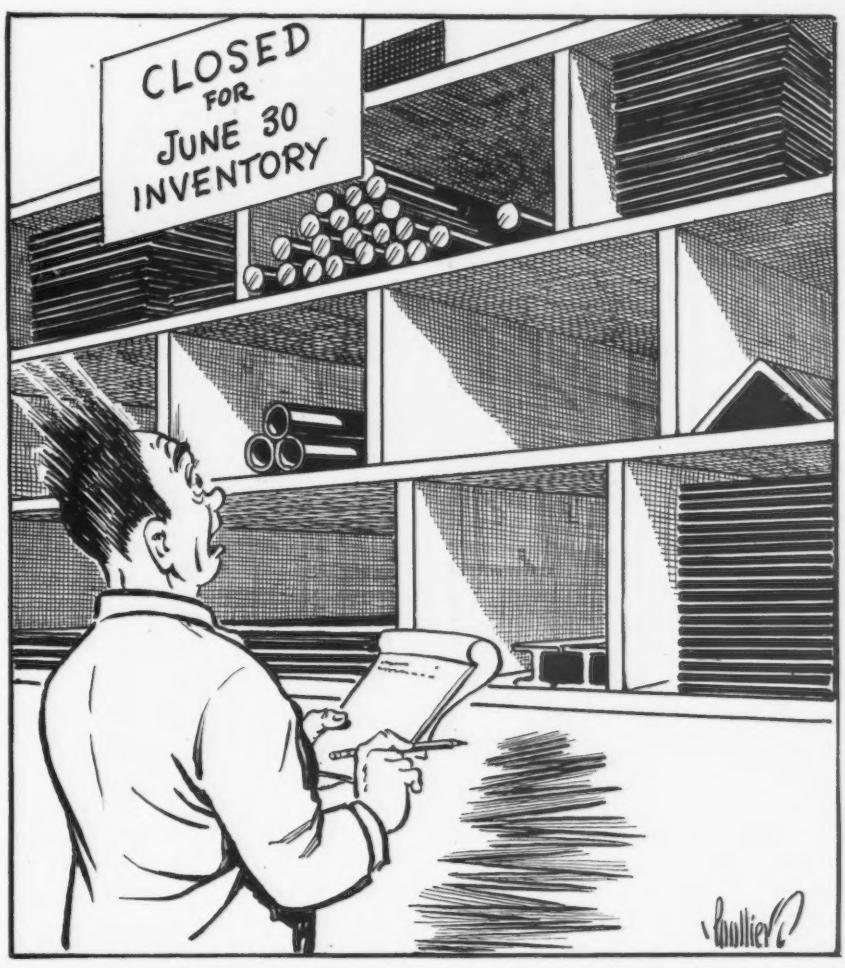
it still is necessary for businesses having no historical purchases for the base period—and even some quota customers—to go into the open market for steel in order to keep their plants going. This costs them prices ranging as high as $280—the steepest yet quoted to the committee.

A committee source told THE IRON AGE that present plans call for the committee getting together with the steel industry officials near the end of the hearings in an attempt to work out some plan for taking steel off the gray market. This may take one or both of two directions—a possible extension of the quota system to afford some relief to those not now eligible under the 1939-41 base period or tightening of the supervision of distribution. Such a program was worked out in the case of newsprint, it is pointed out.

Meantime, a parade of witnesses continued to take the subcommittee's witness stand to describe the intricate maze they had to travel in order to get the steel—of blind ads, mysterious phone calls, fantastic offerings—amounting in one instance to $40 million—of being handed mysterious letters by strangers to be delivered to other members of the "daisy chain."

In many instances, the supply proved to be a phantom pot of gold

Coming Events



at the end of the rainbow. David Hillstrom of the Corry-Jamestown Corp., Corry, Pa., estimated that he had lost more than $18,000 on deals in which he had made down payments but in which the steel was never delivered.

He decared that to date, in order to keep his plant going, he had paid out more than $206,000 over and above market prices for steel —not including related costs of acquiring it or the money paid for steel which was never delivered.

Part of his loss on these transactions was made up, he said, because he was getting quota steel from four companies with which he had dealt during the base period. Since steel represents a large portion of his cost, he said, as long as fabricators must go into the gray market there is no chance of reducing prices on finished items.

Edgar Kaiser, head of the Kaiser-Frazer Corp., appeared to relate difficulties in getting steel. KF's plant at Willow Run requires about 480 tons of sheet per day at the present automotive production rate which it arranged to obtain through acquiring an interest in the Portsmouth Steel Co., and arranging with Wheeling Steel Co. to roll it.

However, he said, the Wheeling sheet is too narrow for some specific requirements and this was overcome by trading the narrow steel for proper widths. Some of this type sheet is also traded for other needed materials such as copper and lead. It is sold at mill cost, he said, but it was reported to him that it was later offered at a considerable mark-up over going prices although he could not confirm the report.

International Rolling Mill Products Co., Chicago, represented by Ed Ray, its sales manager, told the Senate group that it served 3000 customers who had varying needs to be filled through International conversion facilities. His firm, he said, received quota steel and from this International serves its regular customers. Other acquisitions are made, he said, and converted for outside customers, including Amana Society which told last week of paying $240 for its sheet. Mr. Ray said his firm had another order on schedule for Amana at the same price; part of the high price, he said, resulted from the fact that it had been converted from rails bought on the West Coast at $30 a ton plus $20 freight.

Gerald Firth, of Firth-Sterling Steel Co., McKeesport, Pa., appeared briefly to deny validity of a letter purporting to come from his firm in connection with a grey market offering of steel many times the capacity of his plant. Two handwriting experts, one of them from the FBI, took the stand to pronounce the signature on the letter, that of A. R. Zapp, head of F-S's carbide department, a forgery.

NO GUNS? *E. A. Kerschbaumer, Pittsburgh steel broker, as he appeared last week before the Senate subcommittee investigating steel "gray markets." His statement that James Boyle, a Brooklyn steel broker, had tried to buy steel from him at gun point was denied by Boyle, though one of the group did have a gun.*

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YOU TAKE WHAT YOU GET: *One of the first actual photographs of "gray market" steel. These two carloads of coils were delivered to Corry-Jamestown Corp., Corry, Pa. The Corry corporation had ordered sheet.*

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Calls for National Professional Organization of Engineers

Boston

• • • **Engineers, like doctors,** can be organized as a profession if they choose, William F. Ryan, Boston engineer, declared before a recent meeting of the Worcester Engineering Society. Mr. Ryan, who is assistant engineering manager, Stone & Webster Engineering Corp., Boston, emphasized that such a professional organization would not conflict with present engineering societies any more than the medical profession's technical groups affect the power of the American Medical Assn.

"For 30 years," said Mr. Ryan, "I have been listening to addresses and reading articles about the 'professional status' of the engineer. The authors seem to agree on one point, viz., that his professional status is deplorable. The difficulty, I fear, arises from the fact that professional status is a matter to which the vast majority of engineers are profoundly indifferent.

"Recently my concern has given away to alarm. I have grave fear that if we do not establish ourselves in our own minds and in the public mind as professional men, some other group will establish that we are something else. If we are not professional men, what are we? There are energetic, forceful and well financed people at our gates who are perfectly willing to answer that question. There is only one alternative then to classification as professional men. It is classification in the ranks of labor. 'Technical labor,' perhaps, or 'white collar labor,' but labor, nevertheless. I believe that no engineer, however, indifferent to professional status in the past, is willing to accept the latter classification."

Mr. Ryan went on to say: "When engineers have convinced themselves of the urgency of this problem their first thought will be of organization. That is always an engineer's first thought.

"For technical purposes, we are certainly organized, perhaps overorganized, but as a profession our organization is weird and ludicrous. I am convinced that the professional status of the engineer will never be fully established until engineers become organized *as a profession.* To illustrate what I mean, let us look at a profession that *is* organized as a profession . . . the medical profession.

Declares Professional Status Will Otherwise Never Be Fully Established

° ° °

"Every doctor of the slightest professional pretensions belongs to the American Medical Assn. A doctor in Boston or its suburbs belongs to the Suffolk District Medical Society or to one of the three district societies in Middlesex County. The local society is what he joins and where he votes; memberhip in the state and National Society follows automatically. There are 18 of these District societies in Massachusetts, each of which is a relatively small local group, interested in common problems, and united to work together for the benefit of the public in their community and incidentally for the benefit of themselves as professional men.

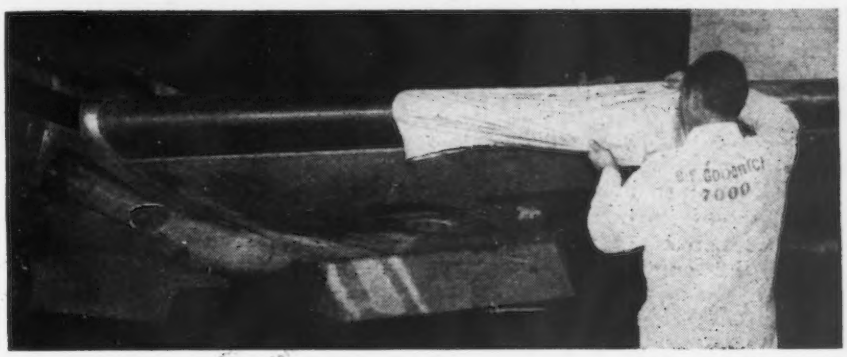
"**These several** district societies form the Massachusetts Medical Society. Similar district societies in the 47 other states, all the territories and the District of Columbia combine with the Massachusetts Medical Society and with representatives of the Medical Corps of the Army, Navy and Public Health Service, to form the American Medical Assn. Every doctor is united with every other doctor to maintain his professional interests in his own locality, in his state and in the nation.

"While some doctors join one society and some another for technical purposes, they all join this one, and leave to it, and to it alone, their professional and economic problems. In this association, they speak with one voice; they represent a united profession," Mr. Ryan declared.

"Bear in mind particularly that this is their professional organization, not their technical organization; although the society has important scientific activities, the technical aspects are secondary. There appear to be more branches of medicine than engineering. The Massachusetts Medical Directory lists 89 national medical societies and 19 district or regional societies in this part of the country, all devoted to highly specialized technical matters. These various branches of medicine are represented in the American Medical Assn. through the Scientific Assembly.

"**Every member** belongs to one of the 16 groups of the Scientific Assembly, each of which elects delegates to the legislature of the parent association. The latter, therefore, represents the individual doctor not only as a resident of Boston, through his dele-

SUMMER COSTUME: *A thin rubber-like protective film developed by B. F. Goodrich Co. protects aircraft de-icers from destructive aging during the hot weather. De-icers can be operated with the strippable film in place if unseasonable icing conditions are encountered.*



gates from the Massachusetts society, but also as a gynecologist, or an abdominal surgeon or as a general practitioner or whatever his particular branch of medicine may be, through his delegates from the Scientific Assembly.

"Observe the simplicity and functional directness of this organization. It is the kind of organization that would be devised by an engineer for any problem except his own.

"Back in the 1920's, civil, mechanical, electrical and mining engineers formed a federation culminating in American Engineering Council. This council was intended to function as a single spokesman for the entire profession of engineering. However, it had no authority of its own. It had only the most indirect ties with individual engineers and it 'died of malnutrition,' " Mr. Ryan said.

"The thoughtful and able men who head these founder societies, however, have never lost sight of the crying need for a single organization to speak for all engineers as a united profession. The Engineers Council for Professional Development and the Engineers' Joint Council are the latest endeavors in this direction.

"In the ECPD, the founder societies have associated themselves with the Society for Promotion of Engineering Education, the American Institute of Consulting Engineers, the Engineering Institute of Canada, and the National Council of State Boards of Engineering Examiners.

"The annual reports of these committees are inspiring reading, but it is disheartening to reflect on the thought and labor expended on these reports, and then consider how little interest in them is displayed by the engineers for whose benefit they were prepared.

"It should be noted that nearly every one of the 34 national organizations have parallel committees each studying the same type of problems for its own particular membership and usually turning up with quite diverse results. Nearly every one of these societies, for example, has a code of ethics of its own. Many now have committees studying unionization of engineers and other social and economic problems. ECPD is an attempt to bring order from this chaos, but like the defunct AEC it is remote from the individual engineer, and it is a sad fact that the majority of members of the eight societies who sponsor ECPD have never heard of it. Very few have any knowledge of or interest in its activities."

Mr. Ryan continued, "When Mr. Morgenthau went to Ottawa to tell the Allies how to incapacitate Germany as a military threat, after the war, the presidents of three founder societies, the civic, mechanical and electrical engineers, were distressed by the amateurishness and incompetence of the program, and undertook to provide the State Dept. with sound engineering advice. They called themselves by some other name at that time, but in any event they threw the weight of their three societies into securing a more rational program for the disarming of Germany.

"While they got more or less of a 'brushoff' from the State Dept. in connection with their initial objective, they felt that concerted action of this kind filled a real need and they formed a permanent organization under the name of Engineers' Joint Council." For this they took into their group the American Institute of Chemical Engineers and the American Institute of Mining & Metallurgical Engineers. The Engineer's Joint Council consists of the presidents, junior past presidents and secretaries of these five societies.

"Serious consideration is now being given to another federation or union of national engineering societies, another super-organization to represent all engineers through joint action of existing societies. A movement toward unification is commendable, but I fear no such coalition can be effective. It is subject to the same defect of remoteness from the individual, and the existing societies whose cooperation would be involved are not strictly professional societies.

"Returning to the local and regional levels, this Boston—New England hodgepodge is repeated in nearly every major industrial center in the United States. The Technology Club of Syracuse is almost exactly analogous to Engineering Societies of New England, Inc. I believe the Engineers Club in Detroit and Philadelphia represent the same general type of effort toward unification, but no two situations are exactly alike, and I certainly pity the EJC committee which is studying engineering organization at the regional level.

The Society of Professional Engineers as now organized is obviously modeled after the American Medical Assn., without the complications of the technical activities in the legislative assembly. . ."**Assume for the moment** that nearly every real engineer in Massachusetts became a member of the Massachusetts Society of Professional Engineers as nearly every real doctor is a member of the Massachusetts Medical Society. We could then subdivide, as the equivalent societies have done in other states like Pennsylvania, into regional chapters, for example, in Lowell, Springfield, Boston, Pittsfield and other industrial centers."

Mr. Ryan continued, "Remember that this society is the only engineering organization which admits nobody who is **not** a professional engineer and which admits any professional engineer regardless of his specialty, and regardless of whether he is an employer, an employee, or self-employed. You can readily see how, with a really representative membership, such an organization could speak for the profession.

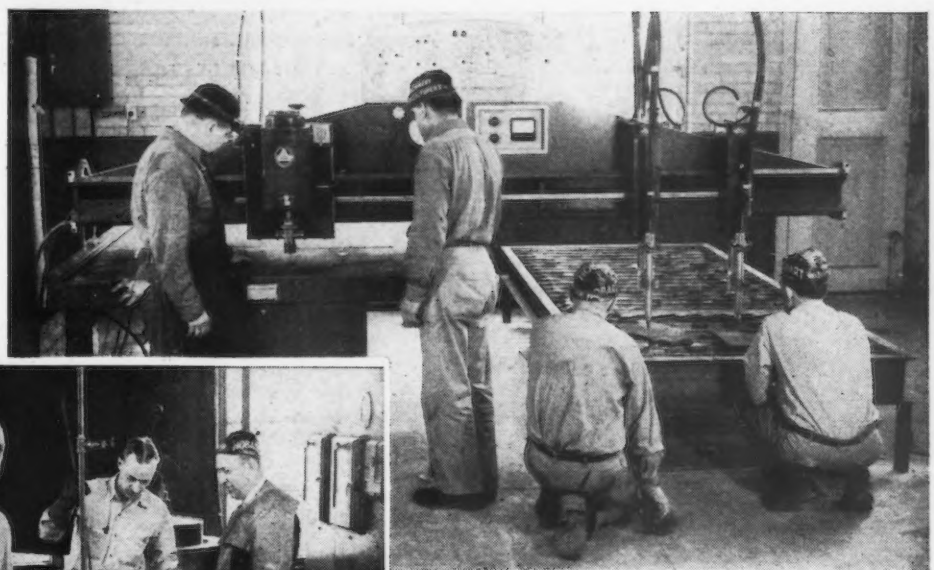
"This Massachusetts Society is a potential professional organization. The sister organizations in other states are becoming something more than a potential force, because they have a large membership. This society will function effectively only when substantially all professional engineers ally themselves with the organization, first having become eligible by getting their status defined by the Commonwealth, and then accepting responsibility for the common good in professional matters. Technical activities can be left to present affiliations.

"A number of people have asked if we are trying to form a union. Well, let's look at the American Medical Assn. again. Is that a union? It is a tremendously powerful agency for collective bargaining. The doctors are organized **as a profession.** The engineers can be organized as a profession, if they will.

Welding Trade School Installs Several New Machines

The Hobart Trade School, Troy, Ohio, trains about 55 men a month in welding, heat treating and allied trades. Ex-GI's make up 90 pct of the student body, taking a 16-week course with new classes entering weekly. These pictures show students learning their trade on new equipment which the 16-year-old school recently installed. A student group, above, is learning to use a new Webb boiler plate roller recently set up in the new gas welding building.

Pipe cutting is part of the course. Flying sparks catch the interest of the class above learning the workings of a new pipe cutting machine. At the right, a group examines a National Cylinder Gas Co. oxy-acetylene flame cutting machine.



Since the alumni are meeting more tool and die steels these days the school emphasizes welding of tool and die steels. The men at the left are at work in the heat treating and tempering department, where the course includes oil, water and air hardening.

Interest in Machine Tool Show Continues to Mount

Reports Heavy Registrations Coming in from U.S. And Foreign Countries

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Cleveland

• • • **While the premiere** of the 1947 Machine Tool Show is still more than 3 months away, the event has already captured the interest of metalworking industry executives throughout America, as well as the rest of the world, if the deluge of requests for advance information being received daily by the National Machine Tool Builders' Assn. can be taken as any indication.

According to Herbert H. Pease, president, NMTBA, and president of the New Britain Machine Co., these are not simply requests for information, but are actual advance registrations.

"These are coming in large numbers from throughout the United States and from foreign countries. Registrations are particularly heavy from South America. In addition, requests for exhibit space continue to be received, although a sellout of space is assured."

Mr. Pease said that the response so far in advance demonstrates that leaders of business and industry everywhere are looking toward this first Machine Tool Show in 12 years as the guidepost to great industrial advancement.

The Show will be held in the Dodge-Chicago plant, the only factory building in the world large enough to hold an exhibit of such magnitude, from Sept. 17 to 26, inclusive. More than 1000 machine tools and related equipment and appliances will be shown in actual operation.

Exhibits will cover more than 500,000 sq ft of space in the building, which now is being used by the Tucker Corp. The show, the fourth to be presented by the NMTBA, will be more than double the size of the last show held in Cleveland in 1935. An attendance of 100,000 is anticipated.

"During the years of the war the emphasis was entirely on quantity production, which meant that machine tool models, for the most part, were frozen," Mr. Pease said. "New developments and techniques were evolved, however, and this show will offer the first opportunity to display these latest advances in the art of removing metal."

Housing of the exhibits in the Dodge-Chicago plant is of itself important because the building is an industrial plant and not an exhibit hall. The plant has floors capable of supporting the heaviest loads required, ample power, and all the facilities for the operation of machine tools under working conditions.

According to NMTBA, there are some 220 types of machine tools made in the United States, with additional variations and sizes of each type, and combinations of various types, especially along the line of special-purpose machines designed for mass production techniques. When to these are added forging machines, various other sorts of metalworking equipment, appliances and accessories, it is evident that the show will be the "world's greatest machine shop."

Held concurrently with the show will be the Machine Tool Congress, with nightly sessions at which papers and discussions will touch upon the latest developments in the metalworking industry.

K. H. Hobbie, president, Chicago Technical Societies Council, is president of the Machine Tool Congress. Nine associations will participate in arranging the program of speakers at the meetings, which will be open to registered visitors at the Machine Tool Show.

Included are American Bolt, Nut & Rivet Manufacturers' Assn.; American Foundrymen's Assn.; American Machine Tool Distributors' Assn.; American Society of Mechanical Engineers; American Society of Tool Engineers; Chicago Technical Societies Council; National Electrical Manufacturers' Assn.; Society of Automotive Engineers and the National Machine Tool Builders' Assn.

A formal dinner of welcome to visiting executives from overseas will be held in the ballroom of the Palmer House, Tuesday evening, Sept. 23. Charles J. Stilwell, president, Warner & Swasey Co., will be toastmaster. There will be speakers of international importance representing government and industry.

Assignment of space in the show has been completed by the show committee headed by Swan E. Bergstrom, sales manager, Cincinnati Milling Machine Co. More than 250 American manufacturers are represented.

Hotel reservations should be made by mailing the form to Chicago Convention Bureau, 33 North La Salle Street, Chicago 2, Ill.

Serving with Mr. Bergstrom on the 1947 Machine Tool Show Committee are: William L. Dolle, president, Lodge & Shipley Machine Tool Co.; R. W. Glasner, president, Clearing Machine Corp.; Helge G. Hoglund, vice-president, Van Norman Co.; Ralph J. Kraut, president, Giddings & Lewis Machine Tool Co.; Donald M. Pattison, vice-president, Warner & Swasey Co.; Louis Polk, president, the Sheffield Corp.

The Chicago Committee includes: Chairman, Rudolph W. Glasner, president, Clearing Machine Corp.; vice-chairman, George Habicht, president, Marshall & Huschart Machinery Co.; Edward K. Welles, president, Charles H. Besly & Co.; A. G. Bryant, vice-president, Cleereman Machine Tool Co.; Harold B. Smith, president, Illinois Tool Works; Norton A. Booz, president, Federal Machinery Sales Co.; M. J. Wiora, vice-president, Bryant Machinery & Engineering Co., and E. Porter Essley, vice-president, E. L. Essley Machinery Co.

On the Registration Committee are: Helge G. Hoglund, chairman; T. B. Buell, sales manager, Sundstrand Machine Tool Co.; Kirke W. Connor, president, Micromatic Hone Corp.; E. Blakeney Gleason, vice-president, Gleason Works; Frank Moran, vice-president-sales manager, Carlton Machine Tool Co., and Robert R. Rhodehamel, general sales manager, National Acme Co.

Weekly Gallup Polls . . .

Weight of Opinion Favors President Okaying Labor Bill

Princeton, N. J.

• • • **One of the big** questions of the day is whether President Truman will sign or veto the labor bill which Congress finally turns over to him, according to George Gallup, director, American Institute of Public Opinion.

The President's decision is bound to produce important political repercussions that may be felt in 1948—a presidential election year.

The weight of opinion throughout the nation as a whole is that the President should okay a labor bill cutting down labor's power a great deal.

Just how the average man feels about what the President should do appears, however, to depend a lot upon what he does for a living.

The group among the voting population made up of white collar workers, farmers, professional and business people, taken as a whole, shows a majority who want to see the President sign a labor bill.

Manual workers—skilled, part-skilled, or unskilled workers—place the weight of their opinion on the side of a veto. This is especially true of union members in the manual workers group. A substantial majority of them say they do not want to see the President okay a labor bill.

In measuring sentiment on the issue, the institute had field reporters in all parts of the country ask:

"If a bill which cuts down labor's power a great deal is passed by Congress, would you like to have President Truman give it his okay or veto it?"

Opinion of the nation as a whole:

	Pct
President should okay bill	46
President should veto bill	38
No opinion	16

People who say they think the President ought to okay a bill to cut labor's power cite three main reasons for feeling the way they do:

(1) Labor is too powerful today.

(2) Too many strikes are occurring.

(3) Labor has run prices up.

Those favoring a veto of a labor bill say:

(1) The laboring class needs some power. It has never had a fair chance.

(2) The working class of people need all the help they can get now in order to get along.

(3) Management should not have all the power.

The public has in earlier surveys been found regarding strikes and labor troubles as one of the chief problems facing the country.

The vote among occupational groups:

	President Should Okay Pct	President Should Veto Pct	No Opin. Pct
Professional, Business, White Collar, Farmers	53	33	14
Manual Workers	37	45	18

The weight of opinion among Democrats is to veto a labor bill cutting down labor's powers a great deal. A large majority of Republicans want to see the President sign such a bill.

This is shown in the following table:

	President Should Okay Pct	President Should Veto Pct	No Opin. Pct
Democrats	35	49	16
Republicans	63	23	14

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• • • **American public** thinking about Russia has during the period since the war's end shown a remarkable sensitivity to events involving U. S. and Russia.

A summary of general attitudes in this country toward Russia appears today to be about like this:

(1) There are a lot of people who think Russia will cooperate with us in world affairs. There are nearly as many who do not.

(2) The majority of people in this country are convinced that U. S. has to be very firm in dealing with Russia. Thus they give their support to the Truman policy in Greece and Turkey.

(3) A lot of people believe that Russia is out to dominate the world.

(4) The American people are very short on patience with Communistic activity in the United States. They think it ought to be against the law to join the Communist Party in the United States. They think Communists ought to be barred from Government jobs.

Majority Among Public Feel That U. S. Should Continue To Try to Get Along With Russia

° ° °

(5) But, a poll just completed across the nation also finds a large majority of the public thinking it is important that we continue to try getting along with Russia.

Evidence bearing this out was brought to light when more than 250 field reporters for the institute questioned a cross-section of the voting public as follows:

"Should the United States continue to try to get Russia to cooperate with us in setting up a world organization or should we go ahead with other nations, such as England and France, and leave out Russia and other nations friendly to her?"

The replies leave little doubt about U. S. sentiment:

	Pct
Continue cooperate	62
Leave Russia out	31
No opinion	7

One of the noteworthy things about the present polls is the fact that large majorities in all the major population groups want to see us keep on trying to get a world organization set up with Russia included.

Democrats and Republicans alike, World War II veterans, people of all educational levels—all show a majority wanting to keep Russia in the world organization picture.

These facts are shown in the following tables:

	Continue Cooperate Pct	Leave Russia Out Pct	No Opinion Pct
World War II Veterans	67	28	5
Democrats	64	30	6
Republicans	60	33	7

(CONTINUED ON PAGE 177)

U. S. Steel Official Says Present Steel Capacity Sufficient

New York

• • • **The steel industry's** present capacity is not only in excess of normal consumption but exceeds the steel required to supply even current demand (exclusive of that needed for rehabilitation of inventory), David F. Austin, vice-president, sales, U. S. Steel Corp. of Del., claimed at the annual meeting of National Assn. of Purchasing Agents here on June 2.

Mr. Austin in a personal opinion forecast that a balance between supply and demand in most steel products will be reached by the end of this year if production remains at 90 pct of capacity or better. He said this balance has already been reached on certain stainless steel and alloy products and on certain sizes of cold-drawn bars.

Indicating that equipment for the expansion of flat-rolled steel capacity would be in operation before the close of 1948, Mr. Austin said the increase in finishing capacity would approximate 3 million tons. He stated that the all-time high of 16 million tons of sheet and strip shipments in 1941 would rise to slightly more than 19 million tons after facilities are completed and in operation.

Touching on steel prices Mr. Austin was emphatic that there would be no lower steel prices at this time. "I find no sound business reason for lower steel prices at this time. Steel, at present price levels, is, and will continue to be, the lowest priced basic product."

Analyzing distribution of pipe and tubing, W. F. McConnor, vice-president in charge of sales, National Tube Co., before the purchasing agents argued that if pipe and tubing have been sold in the black market, actual tonnage is "a very insignificant percentage of the total tubular tonnage."

Mr. McConnor said that export sales of pipe and tubing in 1946 was less than 7 pct of total shipments. Over 90 pct of this tonnage was shipped to American companies operating in South America and the Near East, he said.

GE Develops Camera For Equipment Tests; Speed 1 Millionth Sec

Schenectady

• • • **A camera with** a speed of one-millionth of a second which produces a finished photographic projection within 30 sec after the picture is taken has been developed by General Electric's General Engineering and Consulting Laboratory here.

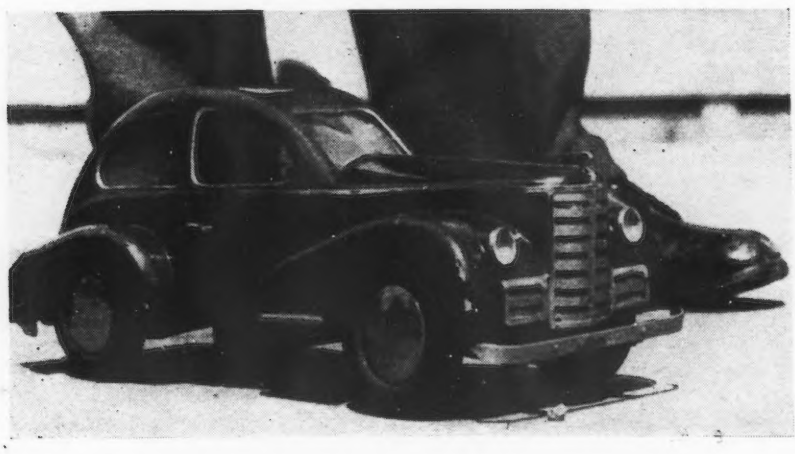
The camera, being 2 ft long and 1 ft high and deep, is not portable, and is not intended for use by the camera fan. Fully automatic with the press of a button, it is part of equipment developed for the rapid testing, by means of electric power surges, of apparatus used in the generation and transmission of electric power. Such tests are made to determine insulation characteristics of new designs, and to assure that equipment under production meets performance specifications.

Used in combination with a cathode ray oscillograph, the camera photographs a visual indication which appears on the television-like screen when a surge of high-voltage electric power is applied to the equipment under test. Since the total duration of the recorded voltage wave may be as short as one millionth to a few hundred millionths of a second, the camera speed must be exceptionally high, according to N. Rohats, GE engineer who directed work on the test equipment.

As soon as the photograph is taken, the operator pushes a button, thereby setting into action the automatic developing equipment built into the camera. The development cycle is finished in 24 sec, and the film is moved into another compartment in which a projector reproduces the negative, enlarged about ten times, on a ground-glass screen at one side of the camera. This picture gives the operator an accurate record of the performance of the equipment during the application of the surge.

Mr. Rohats pointed out that the time saved by the high-speed camera is significant because of the large investment involved in the equipment being tested, the oscillograph, and the associated test set, a generator which produces surges of up to 3 million v. With this new equipment, testing of electric apparatus will be speeded up as much as ten times, he estimated.

DIMINUTIVE DIESEL: *Probably the world's smallest diesel car is this mighty midget built by Alexander Thusius, Berlin engineer, who intends to manufacture it for export. Its engine is the size of a cigarette pack. Details on where or when it can be bought are not yet available.*



Group Will Discuss Management Problems

Chicago

• • • **A series of 3-day** plant management conferences have been announced by the National Metal Trades Assn. The meetings have been arranged to give top management an opportunity to sit with their shop executives and participate in discussion of timely problems and mutual responsibilities.

The meetings will be held June 8 to 11 and June 11 to 14 at the Dell View Hotel, Lake Delton, Wis., for members from states west of Ohio, and June 22 to 25 at the Sagamore Hotel, Bolton Landing, Lake George, N. Y., for eastern NMTA members.

AMA Plans New York Meeting on June 11-12

New York

• • • **The American Management Assn.** has announced the completed program for its conference in New York June 11 and 12 at the Waldorf-Astoria. Business executives of companies throughout the nation will discuss business adjustment to industrial and social change and answers to current business problems which the association predicts "will beyond doubt determine the character of our economic system and business leadership for decades to come."

Two of the conference's five sessions will be devoted to an analysis of business policy problems in finance, production, personnel and industrial relations, marketing and distribution, packaging and merchandising, insurance buying and administration and office organization.

At a third session discussion will be directed at policy as "the conscience of business," management's labor relations, and the use of special research in economics, distribution and policy testing as an aid to business planning. Other sessions will explore what control of atomic energy means to business management and the possibilities for stability in labor-management relations indicated by the recently signed two-year labor agreement of the U. S. Steel Corp., and the USWA.

Reports Violations Of Labor Laws by 52 Pct Of Metals Industry

Washington

• • • **About 52 pct of** the metals and metals products industries inspected during the 1946 fiscal year under the Fair Labor Standards and the Public Contracts Acts were held to be in violation of one or more of the minimum wage, overtime or child labor laws, according to the Dept. of Labor.

As a result of the inspections, involving 5492 establishments and 71,000 workers, restitutions were made to the amount of $4.6 million, the Department said.

Axial Air Gap Electric Motor Uses New Principle to Save Weight and Space

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IN THIS latest product of Fairbanks, Morse & Co., Chicago, the magnetic lines of force follow a path parallel to the shaft in contrast with the radial path of the magnetic lines of force in the conventional motor. Space is saved and weight cut 30 pct, the company said, in announcing that 20,000 of these new motors are in use today, in ratings from 1/3 to 10 hp. Above, left, a conventional motor and at its right the new axial air gap unit. Above, on a machine tool, and left, disassembled.

Canadian Steel Production and Shipments

Toronto

• • • Canadian production of primary iron and steel shapes for the month of February totaled 257,556 net tons, as compared with 267,511 tons in January and 234,863 tons in February, 1946. The February output includes 62,135 tons for producers' interchange, which represents the amounts shipped to producers' own plants or to other plants within the primary industry, for further processing, e.g., black sheets to galvanizing departments, hot-rolled bars to make railway track materials, etc. For the month under review production included 250,730 tons of carbon steel shapes and 6826 tons of alloy steel shapes.

Shipments of primary iron and steel shapes in February amounted to 203,924 net tons, of which 196,316 tons were carbon steel and 7608 tons alloy steel; in January shipments totaled 261,114 tons of carbon steel shapes and 7199 tons of alloy steel shapes, while in February, 1946, shipments included 219,993 tons of carbon steel shapes and 4862 tons of alloy steel shapes. The above figures for February, which show iron and steel shapes made for sale do not include deliveries under producers' interchange.

For the first 2 months of this year production of primary iron and steel shapes totaled 525,067 net tons, whereas shipments, exclusive of producers' interchange which amounted to 118,186 tons, totaled 416,186 tons, which compares with 481,606 tons produced and shipments of 468,100 tons, including producers' interchange, for the corresponding period of 1946. The following table shows production and shipments for sale of primary iron and steel shapes for the month of February in net tons:

February, 1947	Carbon Steel		Alloy Steel	
	Made	Shipped	Made	Shipped
Billets, etc. for forging	6,978	3,986	485	495
Other semi-finished shapes, not for re-rolling by makers	35,501	19,839	208	10
Structural shapes and piling	12,019	12,614	.....	.....
Plates	14,904	14,974	.....	.....
Rails	19,114	17,087	.....	.....
Tie plates and track material:				
Splice bars	268	883	.....	.....
Tie plates	6,423	5,991	.....	.....
Spikes	1,140	1,196	.....	.....
Tool Steel	200	198	270	306
Concrete reinforcing bars	4,403	4,724	.....	.....
Hot rolled bars for cold finishing	876	.....	.....	.....
Other hot rolled bars	47,967	40,788	4,404	5,419
Pipes and tubes	12,545	12,541	.....	.....
Wire rods	20,350	14,838	12	22
Hot rolled black sheets	18,591	12,174	.....	.....
Cold reduced black sheets	2,453	2,453	.....	.....
Galvanized sheets	7,442	6,599	.....	.....
Steel castings—By ingot makers	1,329	1,271	62	34
—By other foundries	3,452	3,352	1,195	1,139
All other shapes, including tin plate, tin mill, black plate, cold finished bars and strips, etc.	34,775	20,810	190	183
TOTAL	250,730	196,316	6,826	7,608

Producers' shipments of primary iron and steel shapes, sub-divided according to principal consuming industries for the month of February, in net tons follow:

Industry	Carbon Steel	Alloy Steel
Automotive industries	7,198	3,861
Agricultural, including farm machinery	11,101	200
Building construction	22,906	40
Containers industry	16,005	1
Machinery and tools	12,975	627
Merchant trade products	21,101	95
Mining, lumbering, etc.	5,395	367
National defense	29	1
Pressing, forming and stamping	10,141	58
Public works and utilities	776	33
Railway operating	30,178	224
Railway cars and locomotives	5,434	42
Shipbuilding	2,762	23
Miscellaneous and unclassified	1,062	91
Wholesalers and warehouses	29,267	250
Direct export—To British Empire	19,658	227
—To other countries	328	1,468
TOTAL SHIPPED FOR SALE	196,316	7,608
Producers' Interchange	61,882	253

Completes Articles For ASM Metals Handbook On Mechanical Testing

Cleveland

• • • Five members of the American Society for Metals committee on mechanical testing of ferrous and nonferrous metals have completed the correlation of a group of articles for publication in the Society's 1947 Metals Handbook, according to W. H. Eisenman, national secretary of ASM.

The mechanical testing committee consists of A. O. Schaefer, Midvale Co., Nicetown, Philadelphia; Maxwell Gensamer, Pennsylvania State College, State College, Pa.; Howard Scott, Westinghouse Electric Corp., East Pittsburgh; R. L. Templin, Aluminum Co. of America, New Kensington, Pa., and E. C. Wright, National Tube Co., Pittsburgh.

Twenty articles have been prepared by various authors for the committee. The articles are of three types: Three introductory articles that concern the subject of mechanical testing in a general treatment; nine articles that describe specific tests such as tension tests, hardness tests, bend tests and others (information in this category includes definitions, purposes of test, method employed, apparatus used, precautions and interpretation of results), and eight articles describing the application of the various tests to particular products such as sheet metal, tube, welds, castings, forgings and wire.

Since 1940 the committee has been engaged in correlating the most recent data on mechanical testing of metals and the resulting articles comprise a new section in the 1947 Metals Handbook.

Information contained in the mechanical testing section is descriptive in nature, but reference, however, is made to various standard methods of testing as published by the several authoritative bodies in this field.

ASM's 1947 Handbook will be distributed to more than 21,000 society members in the United States, Canada, Europe and Asia. It also has a substantial distribution in domestic and foreign research and plant laboratories, libraries and technical colleges and universities.

Survey Shows Hourly Wages of Production Workers Have Risen

New York

• • • **Average hourly** earnings of production workers in the 25 manufacturing industries included in the National Industrial Conference Board's monthly survey have risen since the end of 1945. In February 1946 the wartime peak was passed, and the February 1947 average was 13 pct higher than a year earlier. On the other hand, the average work week during the first 2 months of 1947 was much shorter than during the war period, although a slight upward trend was evident after the first part of last year.

Weekly earnings, the result of the combination of hourly earnings and the number of hours worked, have risen each month since last June, and both the January and February 1947 averages were above the highest point reached during the war.

Real weekly earnings, or actual weekly earnings adjusted for changes in the consumers' price index in terms of 1923 dollars, have fluctuated so widely since the beginning of 1946 that no general trend can be discerned. However, even the lowest point reached during these 14 months was substantially above prewar levels.

Since in June 1945 workers received the highest earnings of any month during the war—$1.11 for an average hour's work — that month was selected for comparison with February of this year, the latest month for which data are available. The increase in hourly earnings over this period of less than 2 years amounted to 16.5¢ or 14.9 pct.

In June 1945 the work week averaged 45.2 hr and in February 1947 it was 40.8 hr, a decrease of 4.4 hr or 9.7 pct.

The overall change in employment from June 1945 to February 1947 was a small rise of 0.9 pct. The changes in employment in the individual industries, however, ranged from a decrease of 30.8 pct to an increase of 42.1 pct, with six industries showing decreases and nineteen increases.

In June 1945 the proportion of the workers in the female, unskilled male and skilled male groups were 26.8 pct, 13.0 pct and 60.2 pct, respectively. For February 1947 the corresponding figures were 19.4 pct, 14.9 pct, and 65.7 pct. This increase in the highest-paid group, the skilled males, with the decrease in the lowest-paid, the women workers would tend to raise hourly earnings somewhat, but certainly not so much as the 14.9 pct increase which actually occurred.

A new round of increases has recently been announced by the major companies in three industries—iron and steel, automobile and electrical manufacturing. The increases in hourly rates will amount to 12.5¢ for the steel workers and 11.5¢ for those in the other two industries. The rise in the average earnings of all workers in these industries depends, of course, on what proportion of the industry pays the new rates. Assuming that the rest of the companies in each case grant the same increases as those already announced, the new hourly earnings will be approximately 9 pct higher than the February averages.

Predicts Large-Scale Exportation of Diesel-Electric Locomotives

New York

• • • **Export of diesel** - electric locomotives to foreign railroads on a large scale within the next 2 years was predicted recently by Robert B. McColl, president of the American Locomotive Co., as he announced an order for 12 1500-hp diesel - electric locomotives for freight service from the Central Railroad of Brazil.

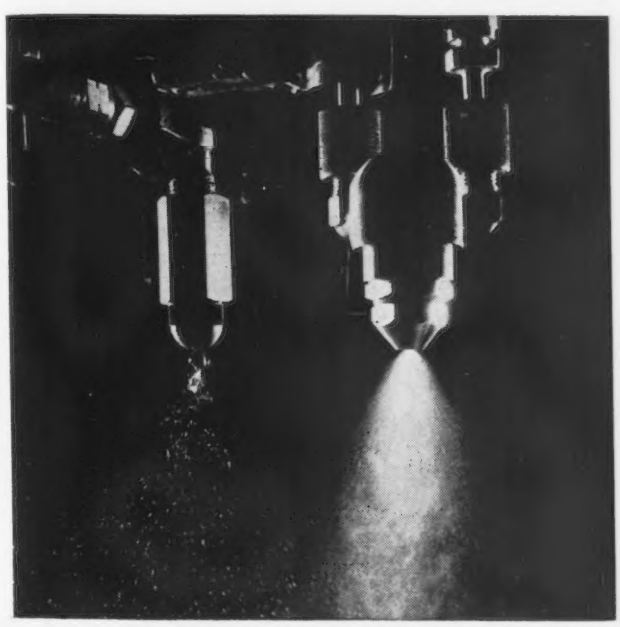
He said that the Brazilian order would be delivered in May 1948 and added that shipments of other heavy road and freight locomotives to Europe and other South American countries would also start within the next 12 months. The Brazilian locomotives will be broad gage.

Commenting on the foreign market, Mr. McColl said, "There is a vast potential market for diesel-electric locomotives outside the United States. The foreign railroads of the world are today in the position that American railroads were in 22 years ago.

"Today, as we find locomotive orders from U. S. railroads overwhelmingly in favor of diesel-electrics, the foreign roads are awakening to the value of the diesel, based on the performance of a few switchers now in service."

Mr. McColl said that inquiries for the purchase of several hundred diesel-electric locomotives have been received from more than a dozen foreign countries in the past few months.

He said that diversion of next year's production to foreign outlets will provide the foundation of many years of desirable foreign sales in the next decade.



FINE FIZZ: Made by a high speed camera in 1/10,000 sec this photo shows the fine spray achieved by a nozzle developed for a new oil-burning gas turbine. The droplets in the new nozzle at the right are but a tenth of the size of those produced by the conventional nozzle at the left. Westinghouse is developing the turbine for possible locomotive or electric power generation.

Assembly Line

(CONTINUED FROM PAGE 92)

area had withdrawn from FAA. It has also been reported that 24 foremen in Memphis have notified the company of their intention to withdraw from FAA.

Meanwhile, Ford negotiations with Local 600 UAW-CIO have reached the stage where Ford has offered the union two alternatives. Ford will renew the present contract as it now stands for a period of a year with an amendment providing for a 15¢ per hr wage increase. In accordance with the industry pattern, 3½¢ of this increase would be used for 6 paid holidays. The wage increase is to become effective May 31.

If the union chooses to continue negotiations further, Ford has offered to make the new agreement effective June 15 with the new contract to contain any changes agreed upon by that time. Pay increases will be retroactive to May 31. Salaried employees receive an increase of 10 pct.

The union has rejected the initial Ford offer, insisting that some sort of a pension provision must be included in the new contract. It may be significant, however, that in the case of Detroit tool and die workers UAW-CIO is insisting upon a straight 15¢ increase without paid holidays. Plants have made what they described as a "final offer" of 10¢ per hr plus paid holidays but this offer has thus far not been accepted by the union.

During the past six months Continental Aviation & Engineering Corp. of Detroit has added 25 pct more research engineers and scientists to its staff for work on jet engines, gas turbines and other military projects for the U. S. Armed Services. Continental Aviation has just purchased the Detroit research building constructed by the Defense Plant Corp. in 1942 to house the company's wartime work. This building, and the adjacent plant which Continental Aviation & Engineering Corp. used prior to the war for development purposes, are now fully in use, it is reported.

Orders for research and development work formed directly or indirectly for the Armed Services are said to be 100 pct greater than a year ago, according to Continental officials.

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Willys Reports Profit As Best Since 1928

Detroit

• • • **Willys-Overland Motors** has reported a consolidated net profit after allowing for taxes of $1,164,886 for the first 6 months of the current fiscal year. The profit return is the greatest 6 months net profit enjoyed by the company for a peacetime year since 1928.

President James D. Mooney, stated that Willys-Overland in the 6 months ended Mar. 31, 1947 more than equalled the total sales for the fiscal year of 1946 which amounted to $60,240,989. During the first 3 months of 1947 Willys produced 28,855 units. Total production for the calendar year 1946 was 77,988 units. Commenting further, Mr. Mooney said that the present outlook indicates that Willys' production goal of 161,800 units during the calendar year of 1947 is attainable.

Briggs Walkout Seen

Detroit

• • • A walkout of 19,000 UAW-CIO members at Briggs Mfg. Co. on June 5 is threatened. Negotiations have been temporarily broken off and then resumed although a wage increase of 11½¢ per hr and holiday pay has been "tentatively accepted" by the union. The company has agreed to continue time and a half for overtime if certain new union proposals are withdrawn and to continue maintenance of membership if dues drives are not repeated. Proposed vacation pay up to $114 for 5 year employees has been offered. The question of an effective date for pay increases is in dispute.

To Investigate Mines

Washington

• • • **A delegation from** the House Small Business Committee will leave soon for Denver to begin investigation of the problems of small and marginal mines.

The Committee is becoming increasingly concerned at the mortality rate among these types of mines and its impact on the country's national resources position. Return of the delegation to Washington will probably signal the beginning of open hearings after a report is made to the full committee.

Members of the delegation will be Chairman Walter C. Ploeser, R., Mo.; Rep. William S. Hill, R., Colo., and Rep. Henry M. Jackson, D., Wash.

Coming Events

June 5-7 Electric Metal Makers Guild, Inc., annual meeting, Pittsburgh.
June 9-11 American Coke & Coal Chemicals Institute, annual meeting, French Lick, Ind.
June 15-19 American Society of Mechanical Engineers, semiannual meeting, Chicago.
June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.
June 17-19 Machinery Dealers National Assn., convention, Cincinnati.
June 23-27 American Electroplaters Society, industrial finishing show, Detroit.
June 23-28 Railway Supply Manufacturers' Assn., Atlantic City, N. J.
June 25 National Assn. of Metal Finishers, Inc., annual meeting, Detroit.
July 14-18 American Society of Civil Engineers, Duluth, Minn.
Aug. 25-29 National Assn. of Power Engineers, Inc., Boston.
Sept. 8-12 Instrument Society of America, conference, Chicago.
Sept. 10-12 Porcelain Enamel Institute, Inc., Columbus, Ohio.
Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Chicago.
Sept. 29-Oct. 3 American Gas Assn., San Francisco.
Oct. 31 Illinois Mining Institute, annual meeting, Springfield, Ill.

SAE Summer Meeting Runs Gamut From Steamers to Plastic Cars

French Lick, Ind.

• • • **Steam powerplants** for trucks, automatic transmissions, plastic cars and rocket fuels were among the subjects on the early part of the program of the summer meeting of the Society of Automotive Engineers being held here during the week of June 2-6. Some of the papers would have been called Buck Rogerism a few years ago; others revived ideas which the automotive engineers have been discussing for years.

The idea of a steam car, no stranger to SAE meetings, was again revived by Edmund B. Neil, Columbus, Ohio, consulting engineer. He said that modern materials and design principles make possible the development of steam or vapor engines for trucks and buses. These engines would be a half to a third the size of present units and more efficient. Elimination or reduction of clutch, transmission, ignition, and carburetion problems would also result, Mr. Neil contended.

A fuel-injection engine with spark ignition and a compression ratio of between seven and 10 to one, was described by Allan M. Starr, of Starr & Sweetland, Piedmont, Calif., as operating economically on a wide variety of fuels, starting easily, and weighing little. Mr. Starr said this engine propels a 3400-lb vehicle 35 to 45 miles on one gallon of fuel at 40 mph.

The engine has intake and exhaust valve heads flush with the cylinder head and close to the piston. Adjacent is a cone-shaped combustion chamber, comprising the compression space, into which a nozzle injects fuel. The fuel mixes with a residual charge and the combination is fired by a spark plug. When the engine operates on light loads, fuel and spark automatically cut out and only half the four or six cylinders function.

Mr. Starr said that test engines are built satisfactorily from standard production cylinder blocks, pistons, and bearings used in normal gasoline engines. He characterized the new engine as having the flexibility of a gasoline powerplant and the economy of a diesel, adding that differences in fuel knock rating, ignition rating, and volatility appear to have little effect upon performance.

Automatic Transmissions, New Type Engines Highlight Opening Sessions

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Development of a "slant engine" of the "barrel" type, with opposed pistons in horizontal cylinders parallel to the main shaft and employing the diesel cycle to transmit power to two "slant plates" instead of a crankshaft, was reported by T. L. Sherman, of The Steel Products Engineering Co., Springfield, Ohio. Mr. Sherman said this compact, light engine will serve power-production needs in the 2500 to 10,000-hp range.

C. F. Kettering's report on the development of high economy high compression engines will be covered in next week's issue of The Iron Age—Ed.

It was reported that a nine-cylinder "slant engine" 43 in. in diam. and 70 in. long produces 1000 hp at 1200 rpm with remarkably low fuel consumption. Outstanding constructional feature was said to be the use of pivoted "slipper pads" which transmit to two rotating "slant plates" the thrusts of the 18 pistons.

E. L. Klein, of Bureau of Aeronautics, Navy Dept., warned that if, in another war, rocket power is used to the same extent as was the reciprocating engine in World War II, fuel could be made available in an emergency only by depriving the American motorist of his gasoline. Other available fuels, he said, would include liquid oxygen, various alcohols, hydrogen peroxide, and organic amines.

Ben T. Salmon, Ryan Aeronautical Co., San Diego, Calif., sang the praises of the composite-powered aircraft. The gas turbine, whether with propeller or jet drive was described as only half as expensive and far less complicated than the reciprocating engine. In the composite-powered planes, he explained, "are found all the good characteristics of both the prop-drive powerplant and the turbo-jet. Each complements the other largely to overcome the inherent operating difficulties of both." The Ryan Co. manufactures the Navy's "Fireball," a turbo-jet, turbo-prop plane.

The old battle of beauty v. functionalism in motor cars was

(CONTINUED ON PAGE 174)

SOLID: *Loaded with solid concrete blocks, this* 15-*ton English truck is road testing a Thornycroft solid injection gasoline engine. The solid injection engine, used on Allied warplanes came in for discussion at the SAE summer meeting. More efficiency and elimination of some equipment are advantages reported.*

Industrial Briefs . . .

• WAGE INCREASE — Keystone Steel & Wire Co. has announced an agreement with the Independent Steel Workers Alliance increasing wage rates to present employees 2½¢ per hr., retroactive to Apr. 1. This supplements the company's announcement of a preliminary wage increase pending determination of a national pattern in the steel industry.

• MERGER—The Yankee Precision Products Co., Hartford, Conn., announces consolidation with Modern Tools, Berlin, Conn. Offices and manufacturing facilities are to be located in the Berlin plant. Modern Tools will continue operation as a division of Yankee Precision.

• OKAYS BUILDINGS—Approval of housing authorities has been given to the Crown Steel Products Co., to construct an additional $85,000 worth of factory and office space at Orrville, Ohio, for the production of sheet metal parts and steel stampings. At the same time, authority was given the Alabama Power Co. to construct a $555,000 power plant at Gadsen, Ala.

• BEARING PLANT SOLD—WAA has announced the sale of the plant in Cicero, Ill., formerly operated by the Strom Steel Ball Co. The Hess Warming & Ventilating Co. of Chicago, has purchased the plant for $361,674. The property will be converted for the manufacture of heating equipment.

• DIESEL ORDER—The Sterling Engine Co. has received a $209,240 order for eight diesel engines from the Coast Guard to replace gasoline engines in patrol cutters. The power plants are of the same type used in diesel locomotives.

• RESEARCH CONTRACT—Bjorksten Research Laboratories, Chicago, has been awarded a research contract relating to subjects pertinent to plastic fabrication by the Nash-Kelvinator Corp.

• CHANGES NAME—The Electric Railway Equipment Co., Cincinnati, has recently changed the name of the company to Elreco Corp. G. K. McKee is president. Also Tulsa Boiler & Machinery Co., Tulsa, Okla., has changed its name to Flint Steel Corp.

• BUYS MACHINE FIRM—Clearing Machine Corp., Chicago, manufacturer of mechanical and hydraulic presses, has purchased the Jackson Hydraulic Machine Co., Inc., of Rockford, Ill., which will be operated as a division of Clearing Machine.

• CONSOLIDATION—Rudel, Carey & Briggs, Inc., New York, has been formed by the consolidation of Rudel-Carey, Inc., and Walter D. Briggs, Inc. Both of these companies have been operating in the fields of high speed and carbide cutting tools, abrasives and machine tool accessories.

• LEASES CHAIN PLANT—WAA has announced that the Pacific Foundry Co. has leased for 5 years the surplus anchor chain manufacturing plant in Portland, Ore., which was operated during the war by the company's affiliate, the Pacific Chain & Mfg. Co. The terms of the lease provide that the plant will be taken over at a minimum rental of $1000 a month, the company paying $6.50 per ton of castings produced and shipped after returns and rejections have been deducted.

• NEW COKE OVENS—The new battery of 74 coke ovens bought last month by Colorado Fuel & Iron Co. from Defense Plant Corp., is expected to be put into service late in June. Addition of the 74 new ovens will bring the Pueblo Plant's total to 262, and will increase the coke output to an estimated 2800 tons or more on a 24-hr coking time as against the present 2180 tons produced on the 20-hr schedule now being followed.

Washington

(CONTINUED FROM PAGE 98)

it would mean a drop in production to about 60 million tons which, basing the calculations on Chart 2, in turn would indicate the equivalent of a 20 pct unemployment. It would mean that about 12 million of the estimated 60-million labor force in 1950 would be unemployed.

As an interesting sidelight, Edgar Kaiser of the Kaiser-Frazer Corp., has sided with the government school of thought. After citing troubles of his corporation in getting steel for new automotive production, he told a Senate subcommittee last week that steel production capacity must be increased if the nation wished to avoid reduced business and purchasing power.

HE said: "The problem (of shortages and prices) will never be completely solved until there is either a substantial increase in steelmaking capacity or the present high demand is reduced. A reduction in demand means lowering of purchasing power and a reduction in the total business of the country . . . It is everyone's hope that the nation's purchasing power will increase and its productive capacity will expand."

Whether steel capacity should be expanded is likely to remain the $64 question for some time. Since the proposal is that facilities be increased by as much as 20 pct, a sizable investment is involved which presumably would have to be made by the more financially able bigger steel companies. Even assuming that the government would have no objection on the grounds of "economic concentration," remembering low production periods of the past, it is safe to assume that the basic steel firms will look long and carefully before they leap.

Whatever the merit of the report, which is not a government study, it nevertheless does reflect the views of some ranking government officials. Just how they would go about expanding the industry is not clear. Senator Murray, known as a liberal, asked Mr. Bean for the report. The Senator said that as an author of the Full Employment Act he was concerned about increased steel capacity.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

985 Tons, Indianapolis, building addition for Indiana Bell Telephone Co. to American Bridge Co., Pittsburgh.

900 Tons, West Branch, Iowa, bridge for the State of Iowa to American Bridge Co., Pittsburgh.

240 Tons, Mountain Home, Idaho and Fort Collins, Colo., hollow jet valves for Anderson Ranch Dam and Horsetooth Dam, Bureau of Reclamation, Denver, Spec. 1663, to Newport News Shipbuilding & Drydock.

230 Tons, Fort Collins, Colo., outlet pipe for Horsetooth Dam, Bureau of Reclamation, Denver, Spec. 1710, to Thompson Pipe & Steel Co., Denver.

210 Tons, Stratford and Warden, Wash., and Oral, S. D., high-pressure gates, etc., for Long Lake Dam, Potholes Dam and Angostura Dam, Bureau of Reclamation, Denver, Spec. 1638, to Williamette Iron & Steel Co., Portland.

175 Tons, Dubuque, Iowa, power station to Clinton Bridge Co.

100 Tons, Westley, Calif., radial gates, Westley wasteway, Bureau of Reclamation, Denver, Spec. 1661, to Berkeley Steel Construction, Berkeley, Calif.

• • • **Fabricated steel inquiries** this week included the following:

4500 Tons, Mississippi River, Lock No. 27, Chain of Rocks Canal, River Construction Co., New York, low bidder.

1625 Tons, Lawrence County, Ark., bridges for State Highway Dept.

1125 Tons, Northport, Wash., superstructure for Columbia River bridge, director of highways, Olympia, Wash., bids to June 10.

700 Tons, Temple, Tex., beam span, Texas State Highway Dept.

625 Tons, Massillon, Ohio, relocation of railroad bridge, U. S. Engineers Office, Huntington, W. Va.

500 Tons, Redwood, Miss., beam span, Mississippi State Highway Dept.

400 Tons, Emco, Ala., building for Electro Metallurgical Co.

255 Tons, Fresno, Calif., paving and separation structures, San Benito Ave. at Broadway, California Div. of Highways, Sacramento, bids to June 25.

• • • **Reinforcing bar inquiries** this week included the following:

1500 Tons, Mississippi River, Lock No. 27, Chain of Rocks Canal, River Construction Co., New York, low bidder.

1360 Tons, Adco, Wash., Columbia Basin Project, Bureau of Reclamation, Denver, Inv. G-38,377-A, bids to June 5.

1195 Tons, Fresno, Calif., paving and separation structures, San Benito Ave. at Broadway, California Div. of Highways, Sacramento, bids to June 25.

800 Tons, St. Louis, branch department store for Famous-Barr Co., contracts to be let shortly.

750 Tons, Chicago, Addison St. sewer project, Michael Pontarelli & Sons, Chicago, low bidder.

500 Tons, Missouri State Highway Commission, Jefferson City, bids due June 3.

470 Tons, Los Angeles, auxiliary service buildings, units 3, 4 and 5, Harbor Steam Plant, Spec. 9821, Guy F. Atkinson Co., general contractor.

200 Tons, Chicago, building addition, rotogravure plant for R. R. Donnelley Co.

• • • **Sheet piling inquiries** this week included the following:

600 Tons, Keewenah Waterways, Mich., through U. S. Engineers Office, Duluth, Minn.

• • • **Steel pipe inquiries** this week included the following:

125 Tons, Long Beach, Calif., city manager, Long Beach, Spec. C-666.

• • • **Railroad equipment awards** this week included the following:

St. Louis-San Francisco Ry. has purchased 46 diesel electric freight and switching locomotives. Contracts for 36 freight units of 1500 hp and four 1000 hp switching units went to Electro Motive Div. of General Motors Corp., LaGrange, Ill., and for six 1000 hp switching units to the Fairbanks-Morse Co. at Beloit, Wis.

Illinois Terminal R.R. has contracted for 350 50-ton steel sheathed box cars to be built by the American Car & Foundry Co., New York.

Parts Suppliers Avert Production Stoppages With Shipments by Air

Pittsburgh

• • • **While the metalworking** plants as such are probably no long term large users of the airlines for product deliveries, shortages of metals and parts have forced manufacturers and fabricators to utilize air freight to meet customer demands. Air freight officials realize that many of the shipments carried by air today will not be air freight business in the future.

Typical of such shipments were recent deliveries of more than 40 tons of automobile parts to Ford and Chevrolet from a tri-state plant. Likewise, a breakdown in a midwestern plant necessitated delivery by air of a 2700-lb machine from Pittsburgh. The recent delivery of some 2600 lb of oil line pipe to Arabia from Pittsburgh Steel Co. is another indication of air freight business caused by shortages.

While most of the airlines have had scheduled freight runs for the past year, there has not been enough elapsed time to determine just what the potential is for air cargo carriers. The certified air cargo carriers indicate that their business has been increasing month by month, and has not reached the levelling off stage.

New domestic and international rates and tariffs are now being set up and within a year practically all of the airlines, domestic and foreign, will be operating under a single set of tariff regulations. Currently, 13 of the domestic lines, nearly 75 pct, have accepted these regulations. Anticipated restrictive regulation of noncertified, nonscheduled carriers may likely throw additional business to the main lines.

At the present time, steel and glass moving out of Pittsburgh by air freight make up a substantial portion of the airlines' cargo business from this point. Practically all of the glass for the aircraft plants of Douglas, Boeing and Lockheed is moving from Pittsburgh by air freight. Pittsburgh Plate Glass Co. is the producer. Connections with international cargo carriers is also a factor in the local business. Currently, one airline is awaiting conversion of three 400-lb motors which will be shipped to Johannesburg, South Africa. The New York to Bombay cargo ship will carry the motors to Cairo, Egypt, where they will be transferred to a British airline and trans-shipped to South Africa.

While air express and air freight are two fundamentally different phases of the air cargo business, air express is by far the older, and from trends in this business an idea of the trends in air freight can be drawn.

Data on air express at Pittsburgh are shown in the accompanying table.

Since air freight became a scheduled service of the airlines into Pittsburgh, the tonnage moved has been increasing as much as 100 pct from one month to the next. Some of this business will be lost when normal business conditions return, airline officials admit. However, the airlines are looking forward to a very heavy increase in business as the railroad car shortage becomes more acute in the weeks ahead. This car shortage is said to be inevitable since the wheat crop in the West is drawing a large number of cars off Eastern roads.

Air Express Movement from Pittsburgh

	Incoming Express, Pounds	Outgoing Express, Pounds
1932	5,191	3,161
1940	303,277	245,571
1941	543,746	411,208
1942	973,400	1,164,968
1943	2,070,916	1,531,970
1944	1,972,460	1,475,835
1945	2,396,809	1,865,326
1946	2,810,379	2,667,707

MACHINE TOOLS

. . . News and Market Activities

Slight Increase Noted in Inquiries for Machine Tools

• • • **In a deceptively** quiet machine tool market, inquiries on machine tools and tooling are increasing slightly, according to reliable sources in the trade where it is reported that buying is not general, but largely of a special nature where short delivery is not important.

Foreign business is presently more attractive to some segments of the industry than domestic business, and at the same time some producers are getting to the point where they would like to move part of their inventory. Poland, Greece and Turkey are logical outlets for some of this equipment, according to some observers, but plans of some major producers to raise machine tool prices may be complicated to some extent by the fact that there are companies with inventory, which normally means a little softness in price, among other things.

Much less is being heard about the government-owned machine tool surplus these days, primarily because much of the cream is gone and also because War Assets Administration, according to report, is moving very few machines. Simultaneously, the Joint Army-Navy Machine Tool program has bogged down in indecision and want of Congressional sanction. Only 8000 machine tools have been tagged out of a once projected 350,000, according to Capitol sources. Little information can be had as to the number processed for storage, and while a second squad of experts was to screen the machines tagged by the original teams, some sources are rumoring that even the 8000 machines tagged are still available to buyers.

Various WAA regional offices, notably Cleveland, have been developing plans for scrapping large numbers of obsolete or overage machine tools in short order. Full details await official approval, but it is known that the Cleveland office has five teams out in the field earmarking machinery and other slow-moving surplus material for the scrap heap. Some $10 million in machine tools await the final classification as scrap at WAA's Warren, Ohio, warehouse, with more to follow elsewhere in the district.

Poland, Greece and Turkey Providing Outlets For Some Equipment

° ° °

In Detroit, a substantial number of prospective purchasers of machine tool are reported to be waiting for the machine tool show before placing orders for new equipment. This is particularly true of small tool and die shops; but major auto producers who are urgently in need of new equipment are reported to be placing a substantial volume of new business.

The recent indefinite postponement of the Chevrolet light car project has resulted in some disappointments, but the number of suppliers affected or the volume of business loss is not expected to be great, since the light car project has never progressed much beyond the engineering stage.

Negotiations between Detroit Tool & Die Manufacturers Assn. and the UAW-CIO have reached a stalemate and there is a possibility that many local tool and die shops may be struck in the near future. Tool shops contend they are heavily penalized by contract overtime provisions, liberal vacation payments, and restrictions on meeting changing working conditions. They are also reported to be paying much higher wage rates than auto producers for the same work. The association has offered its workers 10¢ per hr increase across the board with 6 paid holidays, but the union is holding out for 15¢ per hr, a much more favorable arrangement for the workers.

Association shops in Detroit contend they are losing business to out-of-town shops and that many of their wartime customers have placed their business elsewhere. Detroit shops, it is reported, have been operating for several months below normal.

One of the major auto producers is said to be looking for 200,000 hr of Detroit tool and die work in the next 3 months.

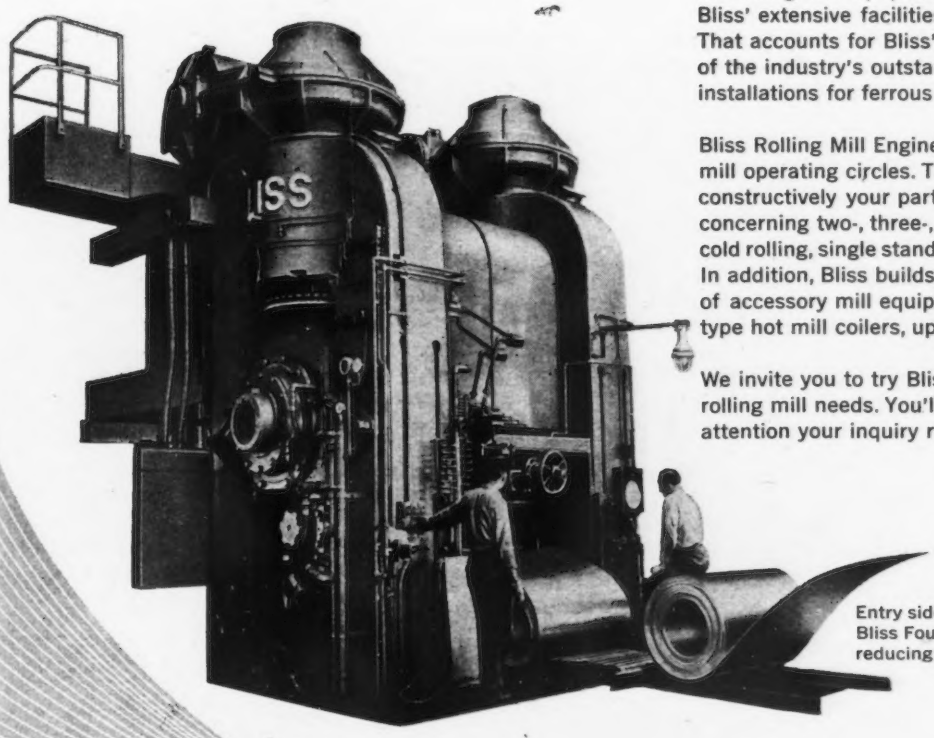
In the East, dealers are still optimistic over the continuing high level of business. They are quick to observe that the order level is not so high as in recent years but that the business is there if gone after. Dealer estimate that they are able to place an order out of every five quotations. News has been received of another price increase announced by builders. In this case it applies to the basic prices of a line of tools and is not merely confined to extra attachments. Shipments from builders continue good and are expected to continue at a high rate unless there is a wave of labor disagreements in the industry.

Consensus of the trade in some sectors is that backlogs were whittled down in May but not as much as in April. May orders were apparently larger, but so were shipments which outweighed the orders. The situation for June, July and August is considered highly problematical, but some believe this year will prove the exception to the rule and see fair business through the summer months as a result of show interest.

In Cincinnati, the machine tool market's only interesting feature was the sale of 260 machine tools at Wright Aeronautical Corp. About 300 tools were offered for sale when the WAA sale began and many buyers had been waiting outside the plant for 24 to 76 hr before the doors were opened. Approximately $3 million worth of machine tools were sold for about $677,000.

Trade sources in the Cincinnati area report that new business comes in small spurts if at all and generally the picture is not too encouraging at the moment.

Rolling Mill "know-how" for the asking...



Entry side of 21" x 50" x 72" Bliss Four-High Mill for cold reducing of aluminum.

No rolling mill equipment problem is too large for Bliss' extensive facilities—design and production-wise. That accounts for Bliss' ability to work out some of the industry's outstanding sheet and strip mill installations for ferrous or non-ferrous application.

Bliss Rolling Mill Engineers are well-traveled in mill operating circles. They're equipped to analyze constructively your particular requirements concerning two-, three-, or four-high mills for hot and cold rolling, single stand reversing or tandem operation. In addition, Bliss builds cluster mills and a variety of accessory mill equipment including mandrel type hot mill coilers, upcoilers, slitters, reels, etc.

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NONFERROUS METALS

. . . News and Market Activities

Ingot Metals Market Dull

New York

• • • **Remelters report** that the lower prices announced recently for brass, bronze and aluminum ingots have not been effective in encouraging renewed buying. Foundries, the largest consumers of these metals, have suffered significant cutbacks in their order volume and are not disposed to place additional orders for metal at this time. Consumers are conscious of their opportunity to obtain ingots on short notice and at current relatively high prices are unwilling to build up inventories. Under the circumstances, it is said, there would be little advantage to announce additional ingot price cuts as that would be unlikely to result in a larger buying movement. However, it is quite probable that if the market continues without orders for any length of time there must be new price action taken by producers. The present market has not been encountered by producers since prewar days.

•

Scrap Market Inactive

New York

• • • **Although lower** asking prices for nonferrous scrap prevailed last week, smelters and refiners remained out of the market. This condition applies to all scrap metals with the possible exception of lead which continues in demand. Some factors attribute the inability of refineries to take on copper and brass scrap to the more than 100,000 tons of battle scrap which is being refined for the account of the British Ministry of Supply. Scrap metals prices currently quoted are purely nominal in the present inactive market. It may be presumed that additional weeks of inactivity may bring lower price quotations.

•

Zinc

• • • **Most grades** of zinc except Prime Western are now readily available to consumers. Prime Western production facilities are not equal to demand from galvanizers who are now reported to be in large scale production. During the war, plant expansion projects were largely in the higher grades of zinc required by the brass mills. These grades are now suffering some degree of restricted buying because of the curtailment of brass mill inventories for the vacation period coupled with the reduction of mill products order backlogs.

•

Cadmium

• • • **Producers report** that the demand for cadmium is still well in excess of supply. The metal continues to be distributed on an allocation basis to established customers. As a byproduct of lead and zinc production there is no prospect of independently increased production to meet the demand except as production rates for those metals are improved. Major producers are still pricing their metal at $1.75 per lb.

•

Lead

• • • **The lead market** continues firm with producers able to supply a large part of the demand in view of the summer decline in requirements, and the high rate of production at which the western producers are operating. A recent survey of these areas by an official of one producer has disclosed almost unlimited supplies of ore ready for treatment and marketing at current high prices. The present difficulty in lead mining areas is the shortage of labor. It is customary for labor at this season of the year to leave the mines in large numbers to work in the fields. When labor returns again in the fall, it is expected that mines and smelters will exceed recent high production levels. It is probable that some degree of price weakness for the metal will become apparent at that time.

•

Copper Shows Weakness

New York

• • • **Reports of a copper** purchase by the British Ministry of Supply at the equivalent of 23.25¢ per lb New York for several thousand tons early this week was one of the first signs of easing in the copper market abroad. The price was a half cent lower than the previously prevailing foreign price. The quotations of sellers here for foreign copper remained at the previous 24¢ level on Tuesday morning.

The world market price is dominated by the British Ministry of Supply's agreements with United Kingdom consumers to supply their requirements at a fixed price for a 6-month period which is extended month by month.

Monthly Average Prices

• • • **The average prices of the major nonferrous metals in May, based on quotations appearing in THE IRON AGE, were as follows:**

	Cents Per Pound
Electrolytic copper, Conn. Valley	22.72
Lake copper, Conn. Valley	21.625
Straits tin, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Lead, St. Louis	14.80
Lead, New York	15.00

Nonferrous Metals Prices

Cents per pound

	May 28	May 29	May 30	May 31	June 2	June 3
Copper, electro, Conn.	21.50—24.00	21.50—24.00	21.50—24.00	21.50—24.00	21.50—24.00	21.50—24.00
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	....	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	21.50 to 24.00
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$85 to $95
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$85.00 to $87.00
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$59 to $62
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.50
No. 120	19.00
No. 123	18.50
80-10-10 ingot	
No. 305	23.50
No. 315	21.75
88-10-2 ingot	
No. 210	28.25
No. 215	27.25
No. 245	21.75
Yellow ingot	
No. 405	15.75
Manganese Bronze	
No. 421	17.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	14.50
No. 12 alum. (No. 2 grade)	14.00
108 alloy	14.25
195 alloy	14.75
AXS-679	14.25
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	13.00
Grade 3—90 pct-92 pct	12.25
Grade 4—85 pct-90 pct	11.75

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	36⅞
Electrodeposited	31⅝
Rolled, oval, straight, delivered	32⅛
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	88¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	40.50
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz	70⅞
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢ 38 to 40, 75.5¢ 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ¾, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢ 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per lb)

These prices, effective May 26, 1947, have not been adopted by all producers.

	Extruded Shapes	Rods	Sheets
Copper	35.03	....	35.18
Copper, hot-rolled	....	31.53	....
Copper, drawn	....	32.53	....
Low brass	35.24	32.27	32.58
Yellow brass	33.39	30.32	30.63
Red brass	35.93	32.96	32.27
Naval brass	30.46	29.21	35.15
Brass, leaded	28.82	25.32	31.13
Commercial bronze	36.87	34.15	34.46
Manganese bronze	34.03	32.53	38.65
Phosphor bronze, 5 pct.	54.67	53.67	53.42
Muntz metal	30.07	28.82	33.26
Everdur, Herculoy, Olympic, etc.	38.44	36.94	39.88
Nickel silver, 5 pct.	41.84	41.23	39.74
Architectural bronze	28.80	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14⅛
Loose yellow brass trimmings	15⅛

Copper and Brass

No. 1 heavy copper and wire	14½—15
No. 2 heavy copper and wire	13½—14
Light copper	12½—13
Auto radiators (unsweated)	9¼—10
No. 1 composition	11½—12
No. 1 composition turnings	11 —11½
Clean red car boxes	10 —10½
Cocks and faucets	9¾—10
Mixed heavy yellow brass	7½— 8
Old rolled brass	7½— 8
Brass pipe	9 — 9½
New soft brass clippings	11½—12
Brass rod ends	10½—11
No. 1 brass rod turnings	10 —10½

Aluminum

Alum. pistons free of struts	5½— 6
Aluminum crankcases	5½— 6
2S aluminum clippings	7 — 7½
Old sheet & utensils	6 — 6½
Mixed borings and turnings	2 — 2¼
Misc. cast aluminum	5½— 6
Dural clips (24S)	5½— 6

Zinc

New zinc clippings	6½— 7
Old zinc	4½— 5
Zinc routings	1½— 2
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	17½—18½
Clean nickel turnings	15 —16
Nickel anodes	17½—18½
Nickel rod ends	18 —19
New Monel clippings	12 —12½
Clean Monel turnings	7 — 7½
Old sheet Monel	10 —10½
Old Monel castings	8 — 8½
Inconel clippings	8 — 8½
German silver clippings, mixed	8 — 8½
German silver turnings, mixed	6 — 6¼

Lead

Soft scrap lead	12½—13
Battery plates (dry)	7½— 7¾

Miscellaneous

Block tin	67 —68
No. 1 pewter	50 —52
No. 1 auto babbitt	38 —40
Mixed common babbitt	11½—12
Solder joints	13½—14
Siphon tops	38 —39
Small foundry type	14 —14½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	10 —10½
New type shell cuttings	10½—11
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

SCRAP

. . . News and Market Activities

Price Increase Extended, Volume Poor

New York

• • • **Heavy melting steel** showed further signs of strength during the past week. Price increases were posted at Philadelphia, Cleveland, Chicago, New York and Boston. This is the second consecutive week of firmness or perhaps, stability, in the market. Cast grades also rose slightly in several districts.

A major Pittsburgh consumer is reported to be out of the market for June but enough others are buying there and elsewhere to give a firm undertone to prices throughout the country. The upward trend is further aggravated, scrap sources say, by relatively light dealer offerings. Some say activity of small collectors has fallen off while others maintain some dealers are holding back in anticipation of higher prices. However it may be, brokers are having trouble picking up substantial tonnages to fill outstanding orders.

Many of those who follow the market believe current firmness merely reflects a price levelling in a return to a normal market. Expectation of a boom such as that staged early this year are unwarrented, they assert.

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PITTSBURGH — Lack of significant purchases of scrap during the past week reaffirms the $32 to $32.50 price for heavy scrap quoted last week. Resistance to this advance was quite strong in some quarters, but there has been some continued minor activity at the higher levels. One of the major consumers stopped shipments of scrap this week because of inventories and will likely continue out of the market for some time. An odd lot of railroad heavy melting scrap moved this week at $34 to $35 and all turnings grades advanced in price this week. While the market for foundry grades has been quite soft during the past 3 weeks, a little more resistance to the declining prices was evident in cupola cast this week. These activities all indicate a stronger tone to the entire scrap market and may be evidence of the market levelling off at a working figure for the various scrap grades.

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CHICAGO—Although going prices on openhearth scrap advanced but 50c last week, cast and specialty items saw considerable increase. No. 1 machine cast in particular showed a sudden spurt as did rails and railroad heavy melting. Some of the turning prices gave evidence of abnormal fluctuation. The continued scarcity of pig iron has forced many foundries back in the market and some of them are again desperate for good scrap.

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PHILADELPHIA—Though some mills were not in the market the competition of others for the rather limited supplies dealers seemed willing to offer made a stronger market here this past week. Some sources believe the market has even greater potential strength than it has shown, though prices were up $2 across the board on most grades.

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NEW YORK—As far as volume of available material goes, brokers report this has been one of the poorest weeks of the year. Prices are up, with purchases in most grades reported at 50c over last week's quotations. While few large orders are outstanding some brokers feel the market may go a bit higher before the week is out and a few are said to be willing to go up another dollar to get hold of a substantial tonnage.

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CLEVELAND—Signs that the scrap market might be getting out of hand again were numerous in this sector this week as brokers were being forced to pay $32.50 to cover on $31.50 orders. The market was very strong, and some major consumers who put out 60-day orders the last time were pushing some of their brokers for shipments. On present orders, most of these consumers will be able to stay out of the market until the first of July. Some sources in the trade are already confidently predicting a $2 raise on No. 1 grades, hinting that closing of some of the railroad lists this week might provide the required impetus.

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DETROIT — Except for a few purchases against old orders, little scrap is moving here on new contracts. Prices as high as $29 for limited tonnages have been reported. Industrial lists are reported as going for $27.32 for openhearth grades. Shipments of cast grades are poor although the tone of the market is firm. Large mill buyers are reported to be still out of the market. The possibility that strikes may tie up auto production here during June is necessarily a factor in making decisions about scrap purchases. Rejections are heavy and have become a subject of increasing concern by both buyers and sellers.

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BOSTON—With dealers' stocks smallest in years and brokers itching to buy, prices are firmer, but so far the price lift has been modest. Dealers, sensing a price rise, are reluctant to sell. For local Navy Yard heavy steel $25.25 a ton was paid at a time when brokers were quietly offering dealers $24.50 for heavy steel and openly quoting $23.25. The Navy Yard sale touched off higher prices throughout the list. Cast is $45 to $50, depending on grade and point of delivery.

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BUFFALO—Openhearth scrap started the new month in a strong position, although prices failed to follow rising markets elsewhere in the absence of important mill buying. Rains and generally unfavorable weather continued to hold down yard production by increasing absenteeism of workers and curtailing peddler collections. Several local yards raised wages about 15 pct last week, lifting the rate for common labor to 90-95c an hr, or more than double the prewar scale of approximately 40c. Reciprocal trading persists in the area, despite reports to the contrary, further limiting the tonnage handled by dealers. Lone price change was in the specialties, where malleable was reduced $2 a ton to a $37-$39 range due to lack of buying interest.

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CINCINNATI—While there has been no appreciable buying to substantiate it, there is a strong undercurrent that would indicate increased prices very shortly. Local buyers indicate they are out of the market and have considerable inventory against buying at higher prices. Prices remain unchanged.

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BIRMINGHAM — Despite recent advances in other areas, scrap prices in this market are unchanged. Most consumers have fair inventories and buying is on a limited scale. Dealers continue to report a sharp decline in daily receipts of unprepared material.

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ST. LOUIS—The strength in the market elsewhere has not been reflected here. There has been a sharp falling off in shipments since the lower prices became effective and dealers are uncertain whether this or the rainy weather in the area or both caused the drop. However there is a steadier undertone to the market with prices unchanged. Railroad lists: Chicago & Eastern Illinois 15 carloads, Wabash 2500 to 3000 tons.

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TORONTO — No improvement is reported in scrap iron and steel supply in Canada and unless speedy relief is forthcoming steel production may be affected. Dealers say receipts are not increasing and that most of their scrap is coming from industrial plants. The announcement by WPTB that there would be no early advance in scrap prices appears to have thrown a further damper on collections and no effort is being made to pick up the large farm accumulations. However, mills are buying big tonnages of European scrap. Lack of cast scrap has forced foundries to turn almost entirely to pig iron.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $32.50
RR. hvy. melting	34.00 to 35.00
No. 2 hvy. melting	32.00 to 32.50
RR. scrap rails	38.00 to 39.00
Rails 2 ft. and under	42.00 to 42.50
No. 1 comp'd bundles	32.00 to 32.50
Hand bdld. new shts.	32.00 to 32.50
Hvy. axle turn.	31.00 to 31.50
Hvy. steel forge turn.	31.00 to 31.50
Mach. shop turn	27.00 to 28.00
Short shov. turn	29.00 to 30.00
Mixed bor. and turn	27.00 to 28.00
Cast iron borings	28.50 to 29.00
No. 1 cupola cast	36.00 to 37.00
Heavy breakable cast	30.00 to 30.50
Malleable	44.00 to 45.00
RR. knuck and coup.	41.00 to 42.00
RR. coil springs	41.00 to 42.00
Rail leaf springs	41.00 to 42.00
Rolled steel wheels	41.00 to 42.00
Low phos	37.50 to 38.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	28.50 to 29.00
No. 1 bundles	29.50 to 30.00
No. 2 dealers' bundles	28.50 to 29.00
Bundled mach. shop turn.	28.50 to 29.00
Galv. bundles	26.50 to 27.00
Mach. shop turn.	23.50 to 24.00
Short shov. turn.	26.00 to 27.00
Cast iron borings	24.50 to 25.00
Mix. borings & turn.	24.00 to 25.00
Low phos. hvy. forge	35.00 to 36.00
Low phos. plates	33.00 to 34.50
No. 1 RR. hvy. melt	32.00 to 32.50
Rerolling rails	37.00 to 37.75
Miscellaneous rails	35.25 to 35.75
Angles & splice bars	38.00 to 38.50
Locomotive tires, cut	38.00 to 39.00
Cut bolster & side frames	36.50 to 37.00
Standard stl. car axles	40.00 to 41.00
No. 3 steel wheels	35.00 to 35.50
Couplers & knuckles	37.50 to 38.00
Malleable	49.00 to 51.00
No. 1 mach. cast	39.50 to 40.00
Rails 2 ft. and under	39.00 to 40.00
No. 1 agricul. cast	37.00 to 38.00
Hvy. breakable cast	34.00 to 35.00
RR. grate bars	34.50 to 35.00
Cast iron brake shoes	36.50 to 37.00
Cast iron carwheels	37.00 to 38.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	27.00 to 28.00
Mach. shop turn	19.00 to 20.00
Shoveling turn.	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Mixed bor. & turn.	19.00 to 20.00
Low phos. plate	36.00 to 37.00
No 1 cupola cast	42.00 to 44.00
Hvy. breakable cast	33.00 to 34.00
Scrap rails	38.00 to 39.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	25.00 to 26.00
Nos. 1 and 2 bundles	25.00 to 26.00
Busheling	25.00 to 26.00
Turnings, shovelings	19.50 to 20.00
Machine shop turn.	18.50 to 19.00
Mixed bor. & turn.	18.00 to 18.50
Cl'n cast. chem. bor.	22.00 to 23.00
No. 1 machinery cast.	45.00 to 50.00
No. 2 Machinery cast.	45.00 to 50.00
Heavy breakable cast.	45.00 to 50.00
Stove plate	45.00 to 50.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$26.75 to $27.25
No. 2 hvy. melting	26.75 to 27.25
No. 1 bundles	26.75 to 27.25
New busheling	26.75 to 27.25
Flashings	26.75 to 27.25
Mach. shop turn	21.50 to 22.00
Short shov. turn	22.50 to 23.00
Cast iron borings	22.50 to 23.00
Mixed bor. & turn	22.50 to 23.00
Low phos. plate	30.25 to 31.25
No. 1 Cupola cast	35.00 to 37.00
Hvy. breakable cast	26.00 to 28.00
Stove plate	30.00 to 32.00
Automotive cast	33.00 to 35.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	27.00 to 28.00
Mach. shop turn.	23.00 to 24.00
Shoveling turn.	23.50 to 24.00
Mixed bor. & turn.	21.00 to 22.00
Clean cast chemical bor.	29.00 to 30.00
No. 1 cupola cast.	42.00 to 43.00
Hvy. breakable cast.	40.00 to 41.00
Cast. charging box	40.00 to 41.00
Clean Auto cast.	42.00 to 43.00
Hvy. axle forge turn.	31.00 to 31.50
Low phos. plate	34.00 to 35.00
Low phos. punchings	34.00 to 35.00
Low phos. bundles	32.00 to 33.00
RR. steel wheels	38.00 to 38.50
RR. coil springs	38.00 to 38.50
RR. malleable	50.00 to 52.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.50 to 27.50
Bundled sheets	26.50 to 27.00
Mach. shop turn.	20.00 to 21.00
Locomotive tires, uncut	33.00 to 34.00
Mis. std. sec. rails	30.00 to 32.00
Rerolling rails	32.00 to 33.00
Steel angle bars	35.00 to 36.00
Rails 3 ft. and under	37.00 to 38.00
RR. steel springs	34.00 to 36.00
Steel car axles	36.00 to 37.00
Stove plate	31.00 to 32.00
Grate bars	31.00 to 32.00
Brake shoes	32.00 to 33.00
Malleable	47.00 to 49.00
Cast iron car wheels	41.00 to 42.00
No. 1 machinery cast.	36.00 to 37.00
Breakable cast	29.00 to 30.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	27.00
No. 2 bundles	27.00
No. 1 busheling	27.00
Long turnings	22.00
Shoveling turnings	24.00
Cast iron borings	23.00
Bar crops and plate	$29.00 to 30.00
Structural and plate	29.00 to 30.00
No. 1 cast	36.00 to 37.00
Stove plate	34.00 to 35.00
No. 1 RR hvy. melt	28.00
Steel axles	30.00 to 31.00
Scrap rails	30.00 to 31.00
Rerolling rails	32.00 to 33.00
Angles & splice bars	29.00 to 30.00
Rails 3 ft. & under	29.00 to 30.00
Cast iron carwheels	30.00 to 31.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.50
No. 2 hvy. melting	30.50 to 31.50
Low phos. plate	35.50 to 36.00
Mach. shop turn.	26.50 to 27.00
Short shov. turn.	27.50 to 28.00
Cast iron borings	27.50 to 28.00
Elec. furnace punch	35.50 to 36.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.50 to $26.00
No. 2 hvy. melting	24.50 to 26.00
No. 2 bundles	24.50 to 26.00
Comp. galv. bundles	22.50 to 24.00
Mach. shop turn.	19.00 to 19.75
Mixed bor. & turn.	19.25 to 20.25
Shoveling turn.	20.75 to 21.75
No. 1 cupola cast	34.50 to 35.50
Hvy. breakable cast.	32.50 to 33.50
Charging box cast	33.50 to 34.50
Stove plate	33.50 to 34.50
Clean auto cast.	34.50 to 35.50
Unstrip. motor blks.	30.50 to 31.50
Cl'n chem. cast bor.	22.00 to 22.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	29.00 to 30.00
Mach. shop turn	21.00 to 22.00
Shoveling turn.	23.00 to 24.00
Cast iron borings	21.00 to 22.00
Mixed bor. & turn.	21.00 to 22.00
No. 1 cupola cast	35.00 to 38.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 38.00
Malleable	37.00 to 39.00
Low phos. plate	32.00 to 34.00
Scrap rails	32.00 to 35.00
Rails 3 ft. & under	37.00 to 38.00
RR. steel wheels	37.00 to 38.00
Cast iron carwheels	37.00 to 38.00
RR. coil & leaf spgs.	37.00 to 38.00
RR. knuckles & coup.	37.00 to 38.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.00
No. 2 hvy. melting	30.50 to 31.00
Compressed sheet stl.	30.50 to 31.00
Drop forge flashings	30.50 to 31.00
No. 2 bundles	30.50 to 31.00
Mach. shop turn.	26.00 to 26.50
Short shovel.	27.00 to 27.50
No. 1 busheling	30.50 to 31.00
Steel axle turn.	30.50 to 31.00
Cast Iron borings	27.00 to 27.50
Mixed bor. & turn.	27.00 to 27.50
No. 1 machinery cast	40.00 to 42.00
Malleable	50.00 to 55.00
RR. cast	40.00 to 41.00
Railroad grate bars	37.00 to 38.00
Stove plate	37.00 to 38.00
RR. hvy. melting	32.00 to 32.50
Rails 3 ft. & under	41.50 to 42.00
Rails 18 in. & under	42.50 to 43.00
Elec. furnace punch.	33.00 to 33.50

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	25.00
No. 1 cupola cast	$32.00 to 33.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast	$35.00 to 36.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$20.00 to $21.00
Elec. furn. 1 ft. und.	23.00 to 25.00
No. 1 cupola cast.	26.00 to 27.00
RR. hvy. melting	21.00 to 22.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	June 3, 1947	May 27, 1947	May 6, 1947	June 4, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.425
Cold-rolled sheets	3.20	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.55	3.55	3.55	4.05*
Hot-rolled strip	2.50	2.50	2.50	2.35
Cold-rolled strip	3.20	3.20	3.20	3.05
Plates	2.65	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	30.30
*24 ga				
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.50
Cold-finished bars	3.20	3.20	3.20	3.10
Alloy bars	3.05	3.05	3.05	2.92
Structural shapes	2.50	2.50	2.50	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	6.15	6.15	6.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.30	3.05
Wire nails	3.75	3.75	3.75	3.25
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$42.00	$39.00
Sheet bars	50.00	50.00	50.00	38.00
Slabs, rerolling	42.00	42.00	42.00	39.00
Forging billets	50.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.30
Skelp	2.35	2.35	2.35	2.05

Pig Iron: (per gross ton)	June 3, 1947	May 27, 1947	May 6, 1947	June 4, 1946
No. 2, foundry, Phila.	$36.51	$36.51	$36.51	$28.34
No. 2, Valley furnace	33.50	33.50	33.50	26.50
No. 2, Southern, Cin'ti	34.75	34.75	34.75	26.94
No. 2, Birmingham	29.88	29.88	29.88	22.88
No. 2, foundry, Chicago†	33.00	33.00	33.00	26.50
Basic, del'd eastern Pa.	36.92	36.92	36.92	27.84
Basic, Valley furnace	33.00	33.00	33.00	26.00
Malleable, Chicago†	33.50	33.50	33.50	26.50
Malleable, Valley	33.50	33.50	33.50	26.50
Charcoal, Chicago	45.99	45.99	45.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$32.25	$32.25	$29.75	$20.00
Heavy melt'g steel, Phila	31.50	29.75	29.75	18.75
Heavy melt'g steel, Ch'go	29.75	29.25	29.75	18.75
No. 1, hy. comp. sheet, Det.	27.00	27.00	24.75	17.32
Low phos. plate, Youngs'n	35.75	35.75	36.25	22.50
No. 1, cast, Pittsburgh	36.50	36.50	41.50	20.00
No. 1, cast, Philadelphia	42.50	41.00	44.50	20.00
No. 1, cast, Chicago	39.75	37.25	39.50	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$10.50	$10.50	$10.50	$7.50
Foundry coke, prompt	11.25	11.25	11.25	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	23.00	23.00	21.50	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when the actual data of shipments for this quarter are compiled.

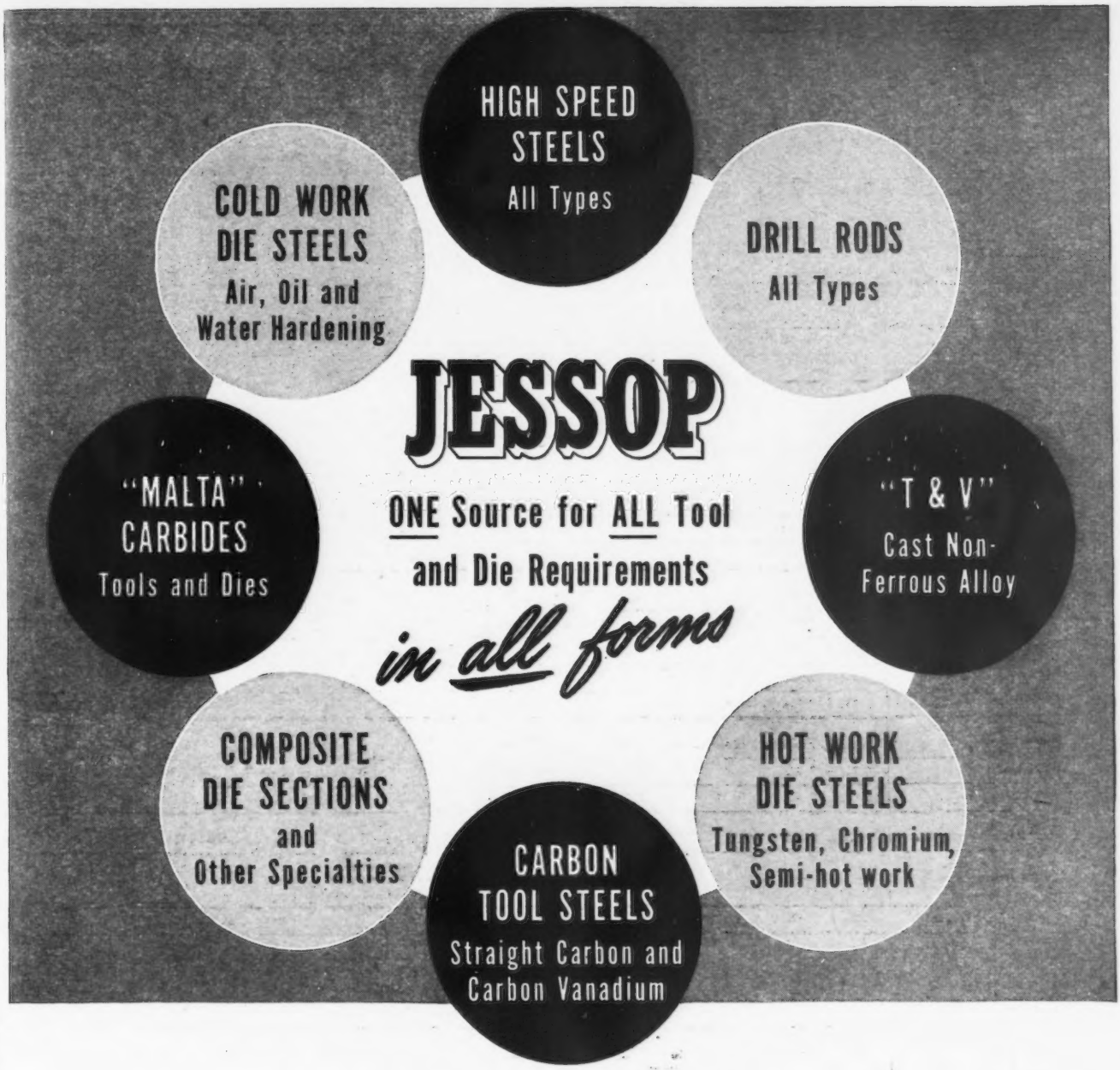
	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 3, 1947	2.85664¢ per lb.	$33.15 per gross ton	$31.17 per gross ton
One week ago	2.85664¢ per lb.	$33.15 per gross ton	$30.42 per gross ton
One month ago	2.85664¢ per lb.	$33.15 per gross ton	$29.75 per gross ton
One year ago	2.73011¢ per lb.	$26.12 per gross ton	$19.17 per gross ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1947	2.85664¢	2.85664¢	$33.15 Mar. 11	$30.14 Jan. 7	$39.67 Mar. 18	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



Rolled • Forged • CAST-TO-SHAPE • Cold Drawn

JESSOP'S diversified line of products enables us to furnish the best product for your applications in tool and die materials.

The most efficient way to meet your requirements for tool and die materials is to call in the nearest JESSOP representative and outline your problem in detail. Since JESSOP makes *all* types of tool and die steels, as well as carbides and cast non-ferrous alloys, the Jessop Service Engineer can make sound, unbiased recommendations as to the type best suited to your particular needs.

JESSOP STEEL COMPANY

WASHINGTON, PENNSYLVANIA

Tailor-made Specialty Steels

Iron and Steel Prices . . .

Steel prices shown here are f.o.b basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6 (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Some sales are at higher prices. (17) Delivered Los Angeles; add ½c per 100 lb for San Francisco. (18) Delivered Los Angeles only.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Bir-mingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00						Canton—$52.00)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo—$53.20) $42.00	$42.00					$45.00		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo—$61.20, Duluth—$52.00[13]) $50.00						$53.00		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton—$61.00)						$64.00		
SHEET BARS							$53.00		Portsmouth, Ohio—$67.20						
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville—2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢	(Worcester—2.65¢)						3.27¢[13]			
SHEETS Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.675¢	2.50¢		3.24¢[17]	2.65¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢			4.32¢[17]		3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP Hot-rolled [3]	2.50¢	2.50¢	2.50¢	2.50¢[15]	2.50¢		2.50¢						2.65¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢		(Worcester—3.40¢)				3.35¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							3.09¢	
TINPLATE Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio—$5.75)		$6.157	$6.062[11]	
Electro, box { 0.25 lb.	Deduct 90¢ from standard coke base box price.														
0.50 lb.	Deduct 70¢ from standard coke base box price.														
0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢		(Warren, Ohio—$5.75)		3.99¢	3.90¢	
BLACKPLATE, CANMAKING 55 lb. to 70 lb.	Deduct $1.55 from standard coke base box.														
75 lb. to 95 lb.	Deduct $1.65 from standard coke base box.														
100 lb. to 118 lb.	Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢	2.98¢
Rail steel [6, 16]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢		2.74¢	2.65¢
Reinforcing (rail) [7, 16]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢								
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢							3.35¢	3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton—3.05¢)					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.95¢		
PLATE Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Coatesville, Claymont—2.80¢, Geneva, Utah—2.80¢) 2.65¢				3.46¢[14]		2.87¢	2.85¢
Floor plates	3.90¢	3.90¢												4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville—4.10¢)									4.01¢	3.895¢
SHAPES, Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah—2.65¢) (Bethlehem—2.50¢)					3.17¢[18]		2.70¢	2.84¢
SPRING STEEL, C-R 0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester—3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester—4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester—5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester—7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester—9.30¢)								
MANUFACTURERS' WIRE [9] Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢	(Worcester—3.40¢, Duluth—3.35¢)						5.63¢[13]		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢	(Worcester—4.35¢, Duluth—4.50¢) (Trenton—4.50¢) 5.24¢[13]									4.68¢	4.595¢
PILING, Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.38¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	28.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J. Phila., Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 6 in.)	72.09	72.09	.....	69.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Base per lb
18	4	1	—	74¢
1.5	4	1.5	8	59¢
6	4	2	6	63¢

High-carbon-chromium* ..... 47¢
Oil hardening manganese* ..... 26¢
Special carbon* ..... 24¢
Extra carbon* ..... 20¢
Regular carbon* ..... 16¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.75¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb
No. 1 O.H., per 100 lb $2.50
Angle splice bars, 100 lb 3.00

(F.o.b. basing points) *per 100 lb*

Light rails (from billets) $2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa. 2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard, galvanized and coated nails	$3.75†	$4.83
Cut nails, carloads, Pittsburgh base	5.30	....

†10¢ additional at Cleveland, 30¢ at Worcester.

	Base per 100 lb	
Annealed fence wire	$3.95‡	$4.96
Annealed galv. fence wire	4.40‡	5.41

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column	
Woven wire fence*	84	107
Fence posts, carloads	90††	...
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	94	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alder-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.55
Galvanized	...	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	...	3.75
Cold-rolled	....	....	4.75	....	...	4.75	4.75	4.75	5.00*	4.55†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	55½	41
¼-in.	58½	45
⅜ to 3-in.	60½	47½
Wrought Iron, buttweld		
⅛ in.	2	+20
¼-in.	11½	+10
⅜ and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Steel, seamless		
2-in.	52	38½
2½ and 3-in.	55	41½
3½ to 6-in.	57	43½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	54½	41½
¼-in.	58½	45½
⅜ to 3-in.	60	48
Wrought Iron, buttweld		
⅛-in.	6½	+14
¼-in.	12½	+ 8
⅜ to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$81.56
6-in. to 24-in. del'd New York	79.80
6-in. to 24-in., Birmingham	71.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	95.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
Over 6 in.	45
9/16 & ⅝ in. x 6 in. & shorter	52
9/16 through 1 in, x over 6 in.	48
⅞ & 1 in. x in. and shorter	51
¾ in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	48
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts *Base discount less case lots*	U.S.S.	S.A.E.
7/16 in. and smaller	..	51
½ in. and smaller	48	..
½ in. through 1 in.	..	48
9/16 in. through 1 in.	47	..
1⅛ in. through 1½ in.	45	46
1⅝ in. and larger	44	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts	Consumer
Packages, nuts separate	60 and 10
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ in. and larger)	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets (7/16 in. and smaller)	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws (In packages)	Percent Off List Consumer
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	56
¾ to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200 & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	33¢
Nickel, 150 mesh	51½¢
Silicon, 100 mesh	18.15¢
Solder powder, 100 mesh	3½¢ plus metal
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$10.00 to $11.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	11.00 to 12.00
Foundry, Byproduct	
Chicago, del'd	$16.10
Chicago, f.o.b.	15.10
New England, del'd	17.25
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, del'd	15.46
Buffalo, del'd	16.14
Ashland, Ohio, f.o.b.	13.35
Painesville, Ohio, f.o.b.	14.60
Erie, del'd	15.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	13.25

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Ohio	$64.00
First quality, Pa., Md., Ky., Mo.	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo.	64.00
Sec. quality, New Jersey	59.00
Sec. quality, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	$70.00
Chicago District	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. Billmeyer, Pa., Millersville, O.	10.55

Midwest, add 10¢; Mo. Valley, add 20¢

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP				BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Plates	Standard Structural Shapes	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.14	$5.18	$5.29	$4.43	$5.28	$4.44	$4.22	$4.48	$5.13	$8.37	$8.37	$9.88	$9.88
New York	4.22	5.17[1]	5.47	4.62	5.40	4.62	4.37	4.62	5.17	8.42	8.42	9.92	9.92
Boston	4.40	5.22	4.95[12]	4.65	6.36	4.70	4.47	4.62	5.22	8.62	8.62	9.97	9.97
Baltimore	3.89	....	5.14	4.40	....	4.39	4.34	4.45	5.10	....	....	....	....
Norfolk	4.15	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	3.65	....	....	4.05	5.05	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Milwaukee	4.099	4.899[1]	5.249	4.199	....	4.399	4.249	4.249	4.899	8.399	8.399	9.649	9.649
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.75	8.358	8.358	9.35	9.35
Buffalo	3.95	4.65[1]	5.35	4.30	5.25	4.55	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Detroit	4.05	4.85	5.42	4.34	5.24	4.49†	4.42	4.20	4.87	8.51	8.51	9.74	9.74
Cincinnati	3.916	4.716	5.166	....	....	4.553	4.444	4.403	5.053	....	....	....	....
St. Louis	3.999	4.799[1]	5.424	4.199	5.424	4.399	4.249	4.249	5.074	8.574	8.574	9.824	9.824
Pittsburgh	3.95	4.65[1]	5.10	4.05	4.95	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
St. Paul	4.184[7]	4.984[1]	5.434[2]	4.384[7]	....	4.584[7]	4.434[7]	4.434[7]	5.476[6]	....	....	....	....
Omaha	4.668	6.118[1]	5.918	4.868	....	5.068	4.918	4.918	5.818	....	....	....	....
Indianapolis	3.84	4.84	5.29	4.24	5.01	4.51	4.36	4.56	5.01	....	....	....	....
Birmingham	3.65[11]	....	5.20	4.00[11]	....	4.30[11]	4.05[11]	4.05[11]	5.58	....	....	....	....
Memphis	4.27	....	5.97	4.72	....	4.92	4.67	4.67	5.78	....	....	....	....
New Orleans	*4.26[11]	5.77[1]	....	....	....	4.83[11]	*4.68[11]	*4.78[11]	6.14	....	....	....	....
Los Angeles	5.15	7.00[1]	6.70	5.65	8.35[5]	5.10	5.20	5.10	6.90[14]	10.15	9.35	11.05	11.05
San Francisco	4.70[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.90[8]	4.75[8]	7.00[10]	....	....	....	....
Seattle	4.80[4]	6.75[2]	6.30	5.30[4]	....	5.15[4]	4.95[4]	5.00[4]	7.10[14]	....	9.50[6]	....	10.85[6]
Portland	5.00[4]	....	6.25	5.50[4]	....	5.25[4]	5.10[4]	5.10[4]	7.20	....	9.30[6]	....	....
Salt Lake City	5.65	....	7.10	6.35	....	5.70	5.85	5.95	7.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb: strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)						
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	34.00	34.50	35.00	35.50	....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	....
Birdsboro	34.00	34.50	35.00	35.50	39.00	Boston	Birdsboro-Steelton	4.82	....	....	....	....	43.82
Birmingham	29.38	29.88	....	....	....	Brooklyn	Bethlehem	3.00	37.00	37.50	38.00	38.50	....
Buffalo	32.50	33.00	33.50	....	....	Brooklyn	Birdsboro	3.50	....	....	....	....	42.50
Chicago	32.50	33.00	33.50	34.00	....	Cincinnati	Birmingham	4.87	34.25	34.75	....	....	....
Cleveland	32.50	33.00	33.50	....	....	Jersey City	Bethlehem	1.84	35.84	36.34	36.84	37.34	....
Duluth	33.00	33.50	34.00	34.50	....	Jersey City	Birdsboro	2.33	....	....	....	....	41.33
Erie	32.50	33.00	33.50	34.00	....	Los Angeles	Provo	5.94	38.94	39.44	....	....	....
Everett	29.00	29.50	30.00	30.50	....	Mansfield	Cleveland-Toledo	2.33	34.83	35.33	35.83	36.33	....
Granite City	32.50	33.50	33.50	....	....	Philadelphia	Swedeland	1.01	36.01	36.51	37.01	37.51	....
Neville Island	33.00	33.50	33.50	34.00	....	Philadelphia	Birdsboro	1.49	....	....	....	....	40.49
Provo	33.00	33.50	....	....	....	San Francisco	Provo	5.94	38.94	39.44	....	....	....
Sharpsville	33.00	33.50	33.50	34.00	....	Seattle	Provo	5.94	38.94	39.44	....	....	....
Steelton	34.00	....	....	....	39.00	St. Louis	Granite City	0.75 Arb.	33.25	34.25	34.25	....	....
Struthers, Ohio	33.50	....	....	....	....								
Swedeland	35.00	35.50	36.00	36.50	....								
Toledo	32.50	33.00	33.50	34.00	....								
Troy, N. Y.	34.00	34.50	35.00	35.50	39.00								
Youngstown	33.00	33.50	33.50	34.00	....								

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$40.50; f.o.b. Buffalo—$41.75. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $45.99. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	157.00
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	7.00	7.25	7.80
Ton lots	8.00	8.60	10.50
Less ton lots	8.40	9.00	10.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$43.00	$44.00
F.o.b. Pittsburgh	47.00	48.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.65
Ton lots	7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.75
Ton lots	7.75
Less ton lots	8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $68.00 f.o.b. Keokuk, Iowa; $65.75 f.o.b. Jackson, Ohio; $67.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	15.60	17.85	19.60
97% Si, 1% Fe	16.00	18.25	20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.25	4.50	4.70
Ton lots	5.25	5.85	6.15
Less ton lots	5.65	6.25	6.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	...	...
50% Si	7.80	8.30	8.50
75% Si	10.00	10.30	11.05
80-90% Si	11.30	11.60	12.35
90-95% Si	12.80	13.10	13.80

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.75	22.15	22.25
0.50% C	21.50	21.90	22.00
1.00% C	21.00	21.40	21.50
2.00% C	20.50	20.90	21.00
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr. 4-6% C. 6-9% Si	16.60	17.00	17.15

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	21.00	21.40	21.50
Ton lots	22.35	23.00	24.20
Less ton lots	23.35	24.00	25.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	14.00	14.50	16.55
Ton lots	16.10	16.85	19.00
Less ton lots	17.10	17.85	20.00

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.45	20.20
Less ton lots	18.60	19.45	21.20

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35 $2.95
Less ton lots	1.95	2.70 3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	16.00	17.10	19.05
Less ton lots	16.75	17.85	19.80

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	14.25	15.35	17.30
Less ton lots	15.00	16.10	18.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.25
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Les ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	17.00¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	5.50¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed

Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Carbortam, f.o.b., Suspension Bridge, N.Y., freight allowed. Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0%, Al 1.0—2.0%.

Ton lots, per pound	8.0¢

Carnegie Institute To Build 200 Million V. Synchro-Cyclotron

Pittsburgh

• • • **Carnegie Institute** of Technology, planning to build a 200 million v synchro-cyclotron, received a contract from the U. S. Office of Naval Research in support of the project and an offer of equipment at special prices from the Westinghouse Electric Corp.

The savings realized on the equipment plus the Navy contract, according to Robert E. Doherty, president of Carnegie Tech, will bring the total of these contributions to $280,000. This fulfills the conditions of the $300,000 appropriation received by Carnegie from the Buhl Foundation of Pittsburgh in December 1946.

The Foundation stipulated that its grant be supplemented by subscription of at least $250,000 toward the cyclotron from other sources. The total amount of support received by Carnegie for the project is now $580,000, including the original Buhl appropriation.

The projected cyclotron will have 130-in. magnet poles, instead of the 110-in. size projected last year. Total cost of the larger machine may reach $1 million. Principal reason for building the 130-in. magnet synchro-cyclotron lies in the greatly increased research potentialities of such a machine.

The Carnegie accelerator will be the third in the Pittsburgh area and the largest. It will form an important part in the cooperative research program in nuclear science here. The University of Pittsburgh, with its 20 million v cyclotron; Westinghouse Electric Corp., with its 4 million v Van de Graaf generator; and Carnegie Tech will cooperate in a program seeking to unlock more doors in the house of nuclear physics.

The accelerators have different capabilities according to their energy ranges. By combining results of the research of all three it is believed important contributions to science and industry may come out of Pittsburgh.

Dr. Alexander A. Allen, Westinghouse graduate professor of engineering at University of Pittsburgh; Dr. W. E. Shoupp, electronic manager, Westinghouse Research Laboratories; and Dr. Frederick Seitz, head of the Physics Dept., Carnegie Institute of Technology, are in charge of the nuclear research programs at the three institutions.

Accelerators of various types now planned throughout the country are all to be as large or larger than the one planned for Carnegie Tech, the trend being toward use of machines that will produce very high energies. Lack of equipment in the past has impeded investigations of the little understood subnuclear phenomena which take place when very high energy particles collide with various atomic nuclei.

Such effects, now observed only in cosmic rays, can probably be produced in the laboratory by means of cyclotrons capable of producing energies of at least 200 million electron volts (mev), under conditions more satisfactory for study. The Carnegie unit will produce energies of 200 to 250 mev.

o o o

MODEL ATOM SMASHER: *Dr. E. C. Creutz of Carnegie Tech's nuclear research staff uses a search coil to measure the magnetic field in the 1000-amp working model of the electron magnet which will form an important part of the university's synchro-cyclotron.*

o o o

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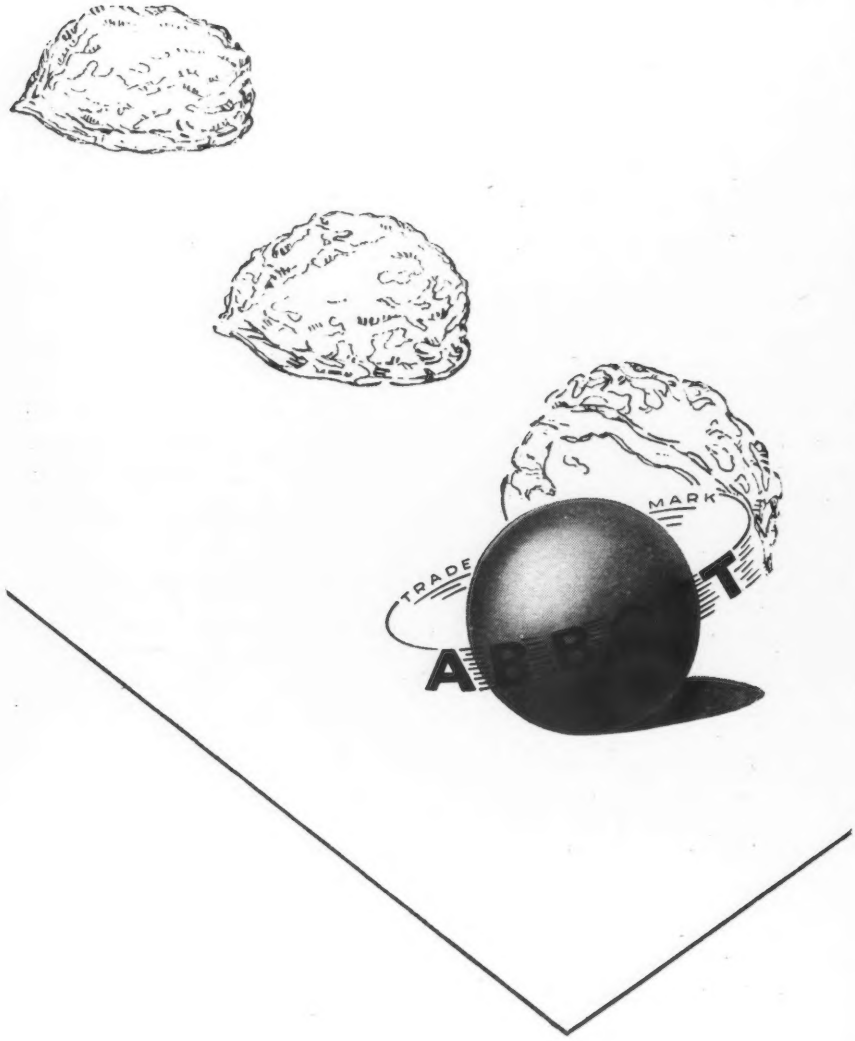

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Britains and Poles Plan Development Of Import-Export Trade

London

• • • **Talks held recently** in London between British and Polish delegations have resulted in provisional arrangements for the long term development of Anglo-Polish trade. Poland plans to place orders with United Kingdom traders over the next 3 years for raw materials and other goods to a value of $80 million, and for machinery and other capital goods totaling $60 million. During the same period Poland proposes to export to the United Kingdom $92 million worth of goods essential to U.K. economy.

Both countries are contributing toward filling the $48 million gap between the Polish program of purchases and the prospective earnings from Polish exports to the U.K. The Polish Government has offered to supply $3.2 million worth of coal (about 280,000 tons) for delivery during the first year to help build up U.K. stocks.

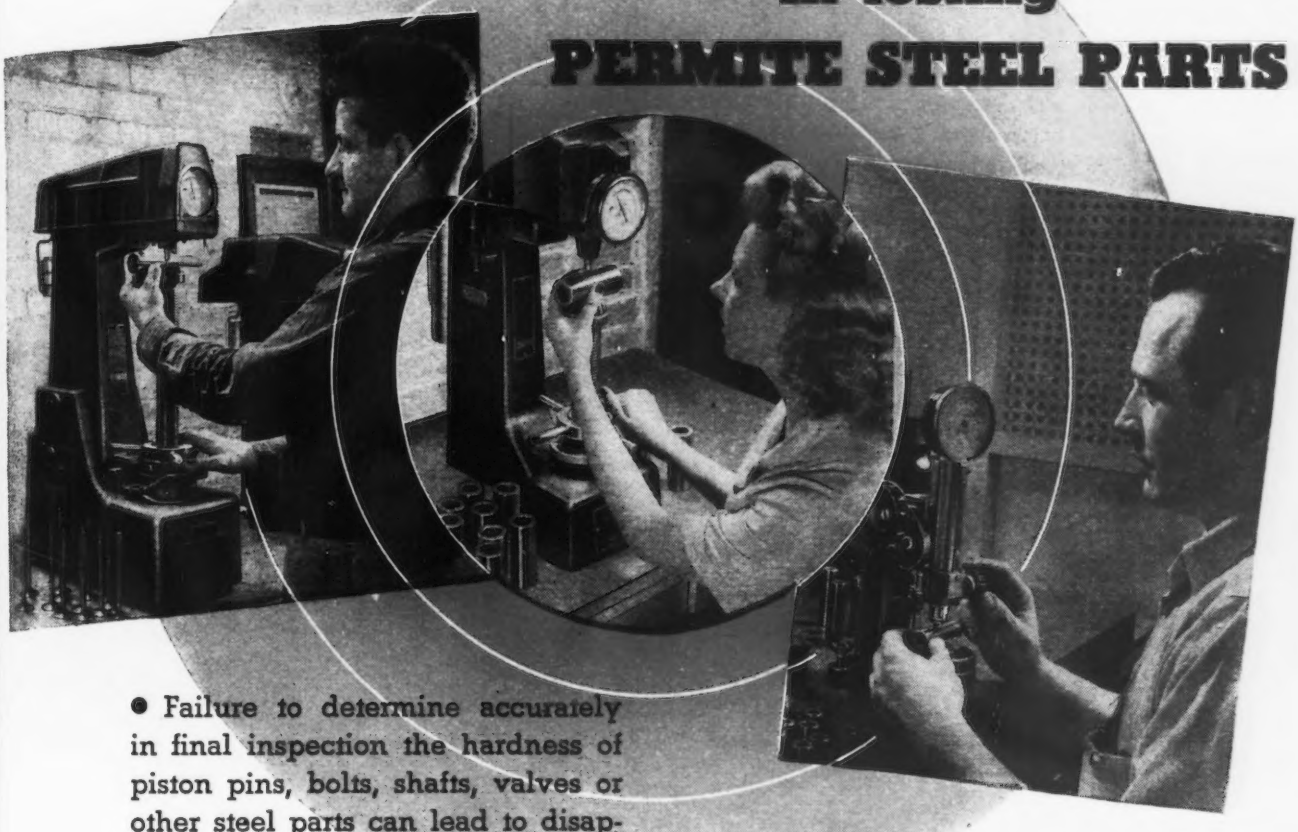
It intends to use for purchases in the U.K. $8 million of the Polish gold released under the financial agreement. In addition it expects to have $6 million available from the realization of various assets in the U.K. which will be released at the conclusion of the Anglo-Polish property agreement, at present under discussion.

As the U.K. contribution, the Polish Government will be allowed to use $6 million of a former gift of surplus stores for buying raw wool, included in the Polish import program for raw materials. The Export Credits General Dept. is prepared to give guarantees to British manufacturers for contracts for machinery and other capital goods on terms providing for payment of 60 pct of the order by the time of shipment, leaving 40 pct on which credit would be extended for a reasonable period. These terms will help in placing orders up to $60 million for machinery and other capital goods.

The above arrangements are at present provisional only. Polish experts will shortly visit the U.K., and following their investigations the two official delegations will meet to confirm the provisional understandings.

HOW HARD IS HARD?

How Permite Insures the RIGHT ANSWER in testing PERMITE STEEL PARTS



● Failure to determine accurately in final inspection the hardness of piston pins, bolts, shafts, valves or other steel parts can lead to disappointing wear resistance in service.

So Permite quality control brings into use three different machines for testing hardness of Permite Steel Parts—the Rockwell Standard Hardness Testing Machine, which determines surface hardness by the depth of penetration of the diamond point; the Superficial Rockwell, which penetrates to a lesser depth so as to avoid piercing the extremely thin case-hardened parts; and the Scleroscope, which tests by a rebound operation that does not mar or mark the part.

This hardness testing procedure is an example of the quality control governing every step in the production of all Permite Steel Parts, to insure longer life and better performance. Permite engineers will gladly consult with you regarding your steel parts requirements.

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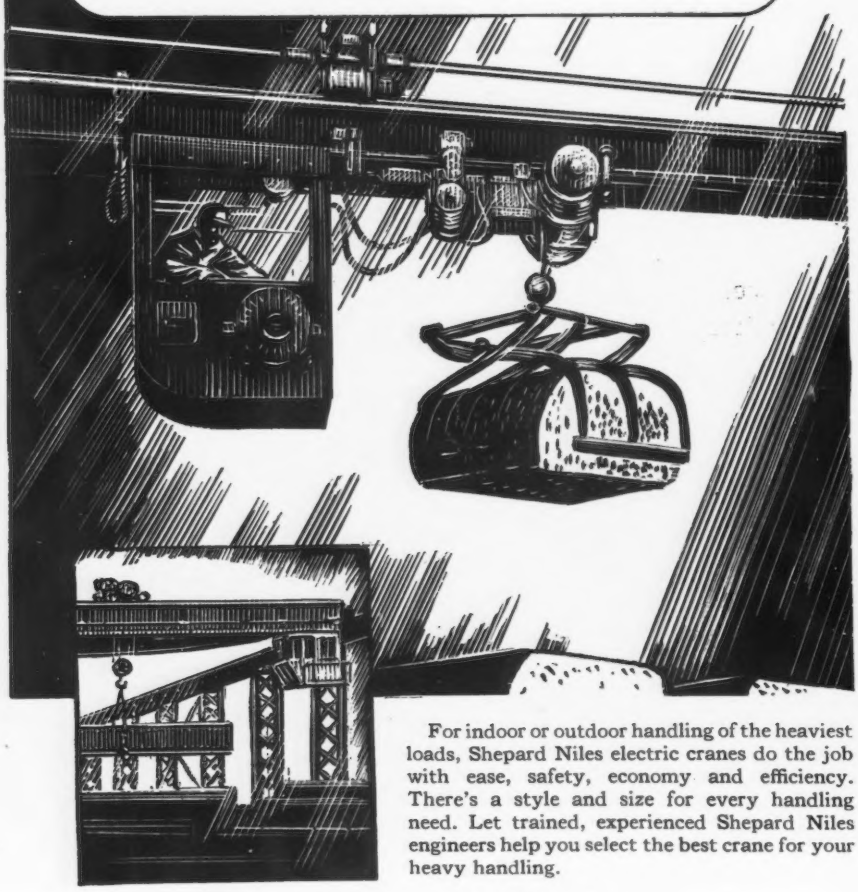
Shepard Niles monorail hoists, whether floor or cab operated, work economically and efficiently, year after year. When a Shepard Niles does the work there's no tired muscles, no absenteeism.



For indoor or outdoor handling of the heaviest loads, Shepard Niles electric cranes do the job with ease, safety, economy and efficiency. There's a style and size for every handling need. Let trained, experienced Shepard Niles engineers help you select the best crane for your heavy handling.

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Holds $1.5 Billion Is The Spread Between Capital And Equipment Account

Washington

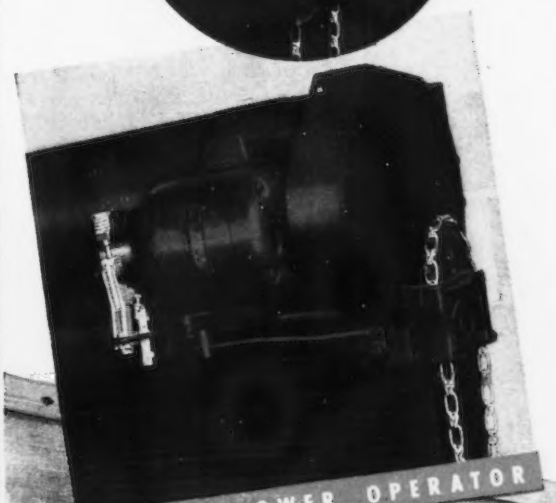
• • • **American industry,** because of the legacy of higher prices left by the recent world conflict, is now suffering an erosion of real capital not offset by depreciation amounting to at least $1.5 billion a year for corporations alone, the Machinery & Allied Products Institute pointed out in a pamphlet analysis issued recently under the title "Depreciation Policy and the Postwar Price Level."

In its study of the effect of postwar prices on depreciation policy, the institute asserted that with postwar prices indexes for all capital goods approximately 50 pct above 1939, and prewar depreciation provisions recovering merely the number of dollars of original cost, "the problem of underdepreciation of prewar assets is sufficiently serious to deserve the earnest attention of business executives and of tax authorities."

The institute's analysis continues: "It can be persuasively argued that current depreciation charges of American industry on assets acquired before the war should be increased by something like one-half. Unless this or other equally offsetting provisions are made, it means that industry will continue to understate the costs arising from the consumption of these assets. This means also that there is an overstatement of profits corresponding to the understatement of costs, that income taxes are being paid on this overstatement, and that there is going on a substantial erosion of real capital, not offset by depreciation charges."

As to present general price level, the analysis states that "while the price structure still contains some serious war-caused abnormalities, and is destined therefore for further internal realignments, there is no prospect that these adjustments will carry the general average down to prewar or indeed any substantial part of the way. There is even less likelihood now of a return to the status quo ante than after the previous war."

Rolling Steel DOORS



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When you select Rolling Steel Doors, you conserve space, provide the permanence of steel and a lifetime of protection and trouble-free service. When you specify Mahon Rolling Steel Doors, you are assured the latest developments, in doors of this type, and many outstanding advantages in operation and design and compactness of operators. See Mahon Insert in Sweet's File for detailed information, complete specifications, installation details and clearance dimensions—or consult a Mahon representative.

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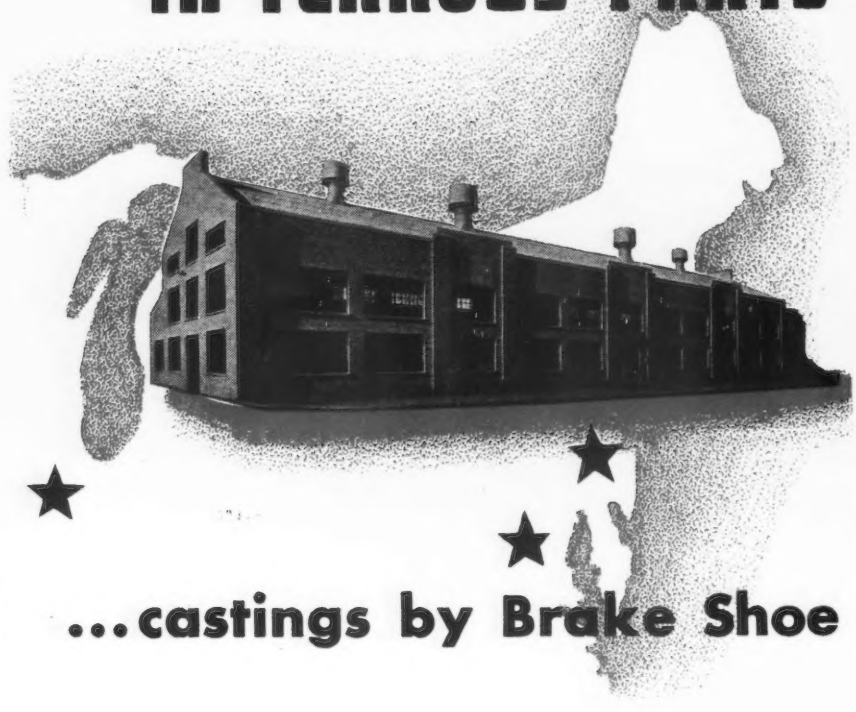

...castings by Brake Shoe

American Brake Shoe Company maintains at Mahwah, N. J. an engineering center and a group of related laboratories. Here the benefits of centralized research are made available to design engineers and production executives.

Here, in a completely-equipped experimental foundry, recommendations are made on the basis of unusually thorough pilot plant tests. As a result, the company is able to render helpful service to all industrials seeking, on the basis of a regular production schedule, ferrous and ferrous alloy parts cast under strict control, from our production foundries in Mahwah, N. J., Melrose Park, Ill. or Baltimore, Md.

A complete metallurgical department can develop a proper metal for a new, specific application or can tell you whether a certain type of Meehanite casting, ABK Metal casting or Gray Iron casting meets your established work demand.

In addition to intricate castings Brake Shoe, of course, offers its facilities at Mahwah, N. J., Melrose Park, Ill. and Baltimore, Md., to users of many *widely-used* kinds of highest grade castings: — light weight, heavy floor work, green, dry sand and all core assemblies.

Inquiries are solicited regarding all these types of castings.

AMERICAN Brake Shoe COMPANY

BRAKE SHOE AND CASTINGS DIVISION
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Army-Navy Teams Hope To Finish Earmarking Tools Before August

Washington

• • • **July 30 has now** been set as the tentative date by which the Army and Navy will wind up their program of earmarking machine tools for set-aside storage against future emergency mobilization, a spokesman for JANMAT (Joint Army-Navy Machine Tool Committee) has so informed THE IRON AGE.

The committee has set a total of about 71,000 machine tools, independent of those in permanent government installations, as its goal for acquisition from government surpluses. About 19,600, or 18 pct of the total, had been selected and tagged for storage as of May 20, leaving roughly about 58,400 to be acquired by the target date.

About 190,000 machine tools are now in WAA inventories, at its most recent report, and 180,000 are expected to be added to it through future declarations.

Prior to the inauguration of the JANMAT program last November, the Air Forces had earmarked some 17,000 tools while Army Ordnance had tagged and stored roughly 7000—over and above those in use in arsenals and other permanent standby or manufacturing plants.

Under instructions of the Army-Navy Munitions Board which directs the program policy, JAN-

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When The Demands Are Rugged MEEHANITE PROPERTIES Are The Answer

The Bull Dog Gyratory Crusher as built by Traylor Engineering and Manufacturing Co., Allentown, Pa., is a truly "rugged" unit built to withstand the severest service in the field.

The massive Gyratory Crusher itself contains over one million pounds of Meehanite castings. Obviously these castings must be sound, uniformly solid, and of equal importance must provide high strength and impact characteristics in combination with good wear-resisting qualities. The difficulties in producing heavy, thick-sectioned castings of this type, free from porosity and casting weaknesses, are well known.

Control during production from the raw material bin to the shipping floor is the keynote in the manufacture of Meehanite castings. The importance of such controls is not limited merely to the achievement of better and more dependable engineering characteristics. They also provide greater uniformity and better machinability. Lower scrap losses mean a reduction of machining costs.

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Rosedale Foundry & Machine Co. . . . . *Pittsburgh, Pennsylvania*
Ross-Meehan Foundries . . . . . *Chattanooga, Tennessee*
The Stearns-Roger Manufacturing Co. . . . . *Denver, Colorado*
Traylor Engineering & Mfg. Co. . . . . *Allentown, Pennsylvania*
Valley Iron Works, Inc. . . . . *St. Paul, Minnesota*
Vulcan Foundry Co. . . . . *Oakland, California*
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TRIPLEX THREADED FASTENERS
CAP AND SET SCREWS · BOLTS, NUTS AND RIVETS

MAT is selecting for retention only those special purpose tools which have no peacetime application and those which are neither in short supply nor essential parts of government-owned industrial plants which are intended for disposal as whole units (complete with machinery and equipment).

Whether JANMAT will meet its Aug. 1 target date will depend upon a number of factors, the Committee is frank to admit. At present it has approximately 50 two-man teams in the field, and 15 additional teams will join them.

Until the middle of May, teams were working in seven WAA regions only—Boston, New York, Philadelphia, Cleveland, Detroit and St. Louis. Since that time six other regions have been opened up —Kansas City, Cincinnati, San Francisco, Los Angeles, Omaha and Houston.

Speed of JANMAT in completing its tagging job will largely depend on progress of WAA in making available the surplus plants to JANMAT inspection.

For instance, as long ago as October 1946, the AAF wanted certain machinery at the Wright Aeronautical plant at Lockland, Ohio. However, JANMAT is still awaiting clearance into the plant since, as of May 19, the stock of tools had not yet been offered to commercial buyers by WAA.

No Output Rise In Heaters and Furnaces

Washington

• • • **Only two metal** items, water heaters and warm air furnaces, failed to share in the continued production rise of building materials during March, according to the latest report of the Commerce Dept. The Department's composite index of construction materials (1939 as 100) rose 8.9 points to 132.1 in March over February.

Cast iron radiation, a scarcity item, led the advance, rising 14 points to 98. On the other hand, production of water heaters dropped from 280 to 224 and warm air furnaces from 214 to 193. Other metal item production indexes for March and the point rise for each are:

Material	March	Rise
Rigid steel conduits and fittings	182.1	12.1
Range boilers	74.2	11.2
Cast iron soil pipe and fittings	167.7	9.6
Wire nails and staples	128.3	8.3
Concrete reinforcing bars	125.1	7.8
Fabricaed structural steel	135.0	1.2

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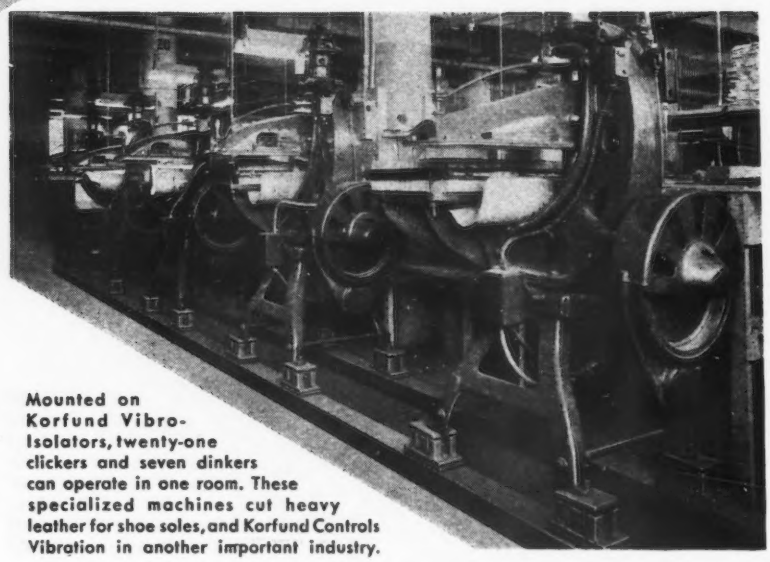
with **KORFUND**
VIBRO-ISOLATORS



Mounted on Korfund Vibro-Isolators, twenty-one clickers and seven dinkers can operate in one room. These specialized machines cut heavy leather for shoe soles, and Korfund Controls Vibration in another important industry.

VIBRATION from any machinery in operation is a disturbance. Where machines are located close together, vibration transmitted along the line slows production, causes excessive machine wear, increases work rejections, and often damages the building structure.

Elimination of these troubles with Korfund Vibration Control Units results in more efficient production . . . less maintenance. In every industry, Korfund "Tailor Made" Vibro-Isolators, standard units developed in a complete range of sizes for impact and reciprocating machinery, are successfully controlling vibration.

Korfund offers you Engineered Vibration Control . . . over forty-five years of experience applied to *your* immediate problem. Write for bulletins giving complete information. "If it's a question of vibration, Korfund has the answer."

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THE KORFUND COMPANY, Inc., 48-35 32nd Pl., LONG ISLAND CITY 1, NEW YORK

New Officers Elected By Chapters of Steel Warehouse Association

Cleveland

• • • **The following** officers have been elected by chapters of the American Steel Warehouse Assn., according to Walter S. Doxsey, president of the association:

Baltimore

President, Arthur M. Pfeiffer, Dietrich Bros., Inc., Baltimore; vice-president, Harold Dell, John J. Greer & Co., Inc., Baltimore; secretary-treasurer, J. D. Boan, U. S. Steel Supply Co., Baltimore; national director, George J. Parke, Eagleston - Parke, Inc., Norfolk, Va.

Buffalo

President, L. N. Stetson, Peter A. Frasse & Co., Buffalo; vice-president, Joseph T. Durham, Drennan Steel Products Corp., Syracuse, N. Y.; secretary-treasurer, Donald P. McCain, Erie Concrete & Steel Supply Co., Erie, Pa.; national director, J. Frederick Rogers, Beals McCarthy & Rogers, Inc., Buffalo.

Central States

President, T. Z. Hayward, Joseph T. Ryerson & Son, Inc., Chicago; vice-president, C. O. Bucksot, W. J. Holliday & Co., Hammond, Ind.; vice-president, E. B. Lapham, Lapham-Hickey Co., Chicago; secretary, T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; treasurer, Earl Whiteway, Steel Sales Corp., Chicago; national director, H. V. Douglas, Central Steel & Wire Co., Chicago.

Cincinnati

President, W. F. Colclough, Cincinnati Steel Products Co., Cincinnati; vice-president, W. D. Dukette, Joseph T. Ryerson & Son, Inc., Cincinnati; vice-president, L. E. Dallas, The Peninsular Steel Co., Dayton; secretary, R. E. Wente, SAE Steels, Cincinnati; treasurer, Edwin Morris, E. K. Morris & Co., Inc., Cincinnati; national director, J. E. Merchant, Edgar T. Ward's Sons Co., Cincinnati.

Colorado

President, J. D. Nicholson, Mine & Smelter Supply Co., Denver; vice-president, William Goldberg,

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Permanete Metals Corp. is experimenting with a magnesium blasting powder that is said to be insensitive to shock and not ignited by sparks.

get ready with CONE for tomorrow

The new Bendix-Stromberg carburetor compensates for changes in atmospheric pressure as in mountain driving.

be ready with CONE for today

Bendix Radio Division's new Type PAR-3 receiver weighs only one and a half pounds and is particularly suitable for small aircraft.

get ready with CONE for tomorrow

New York City's Third Avenue Transit Corporation is shifting from rail cars to buses and will use 700 General Motors 44-passenger diesel buses.

be ready with CONE for today

An electronic "stop watch" developed at Yale University is said to measure the speeds of particles accurately to a thousand millionth of a second.

get ready with CONE for tomorrow

Hudson Products Co. of Detroit makes a grinder with a 3-inch silicon-carbide grinding wheel driven by a water motor that can be attached to any faucet.

For crippled veterans, International Business Machines Corp. has devised an electrically operated artificial arm.

get ready with CONE for tomorrow

North American Phillip Co. is developing an arc welding technique that can be used by unskilled workers.

be ready with CONE for today

Aerojet Engineering Corp. predicts the use of its rocket power for the stopping and starting of heavy machinery.

get ready with CONE for tomorrow

The Bureau of Standards has a new gel capable of detecting one part in 500 million of CO.

The Whiting Corp. of Harvey, Illinois, has an electric hoist that will lift a ton but weighs only 87 pounds.

be ready with CONE for today

American Gas Accumulator Co. is making an inexpensive, breakable runway light for airports that shatters, if struck, without damaging the plane.

get ready with CONE for tomorrow

Dow Chemical Co. has used a solution of calcium chloride to freeze-proof carloads of coal in transit.

be ready with CONE for today

Diamond Instrument Co. is making a portable seismograph, particularly for highway surveys and constructions.

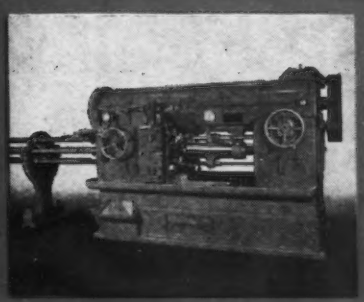
get ready with CONE for tomorrow

New Hampshire Ball Bearings Inc. is the first in this country to put the new ultra-small precision ball bearings into mass production.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

Give *ordinary* jobs to any automatic. Put the *special* ones on a CONE.

From 1¾" dia. SAE 1112, a 6-Spindle Conomatic, with 11 tools, produces the piece shown in 56



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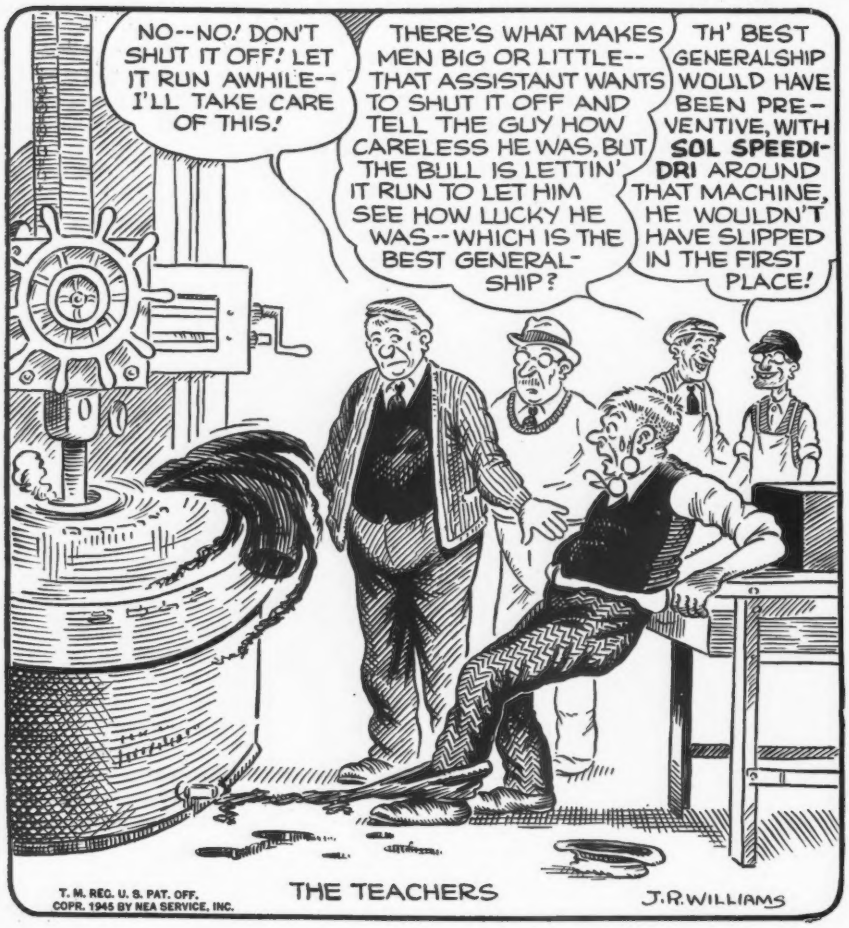
OUT OUR WAY


NO--NO! DON'T SHUT IT OFF! LET IT RUN AWHILE-- I'LL TAKE CARE OF THIS!
THERE'S WHAT MAKES MEN BIG OR LITTLE-- THAT ASSISTANT WANTS TO SHUT IT OFF AND TELL THE GUY HOW CARELESS HE WAS, BUT THE BULL IS LETTIN' IT RUN TO LET HIM SEE HOW LUCKY HE WAS--WHICH IS THE BEST GENERAL-SHIP?
TH' BEST GENERALSHIP WOULD HAVE BEEN PRE-VENTIVE, WITH SOL SPEEDI-DRI AROUND THAT MACHINE, HE WOULDN'T HAVE SLIPPED IN THE FIRST PLACE!
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THE TEACHERS
J.R.WILLIAMS

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Connecticut

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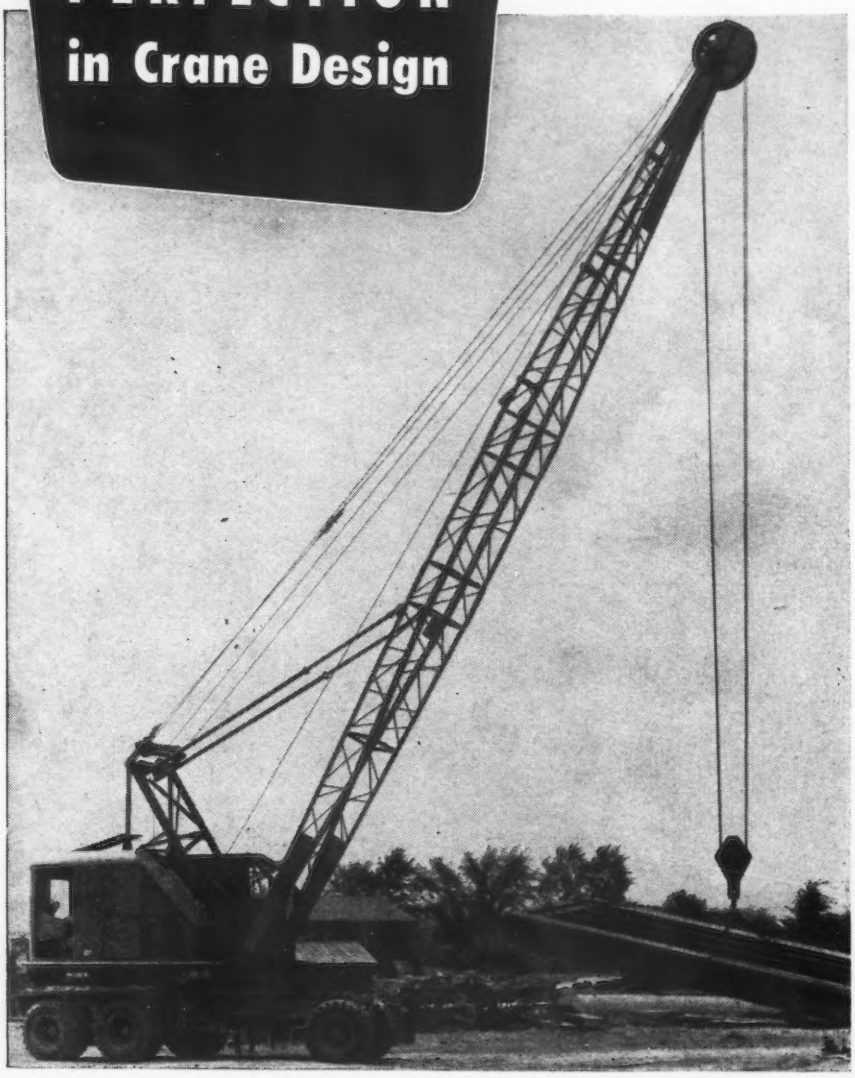

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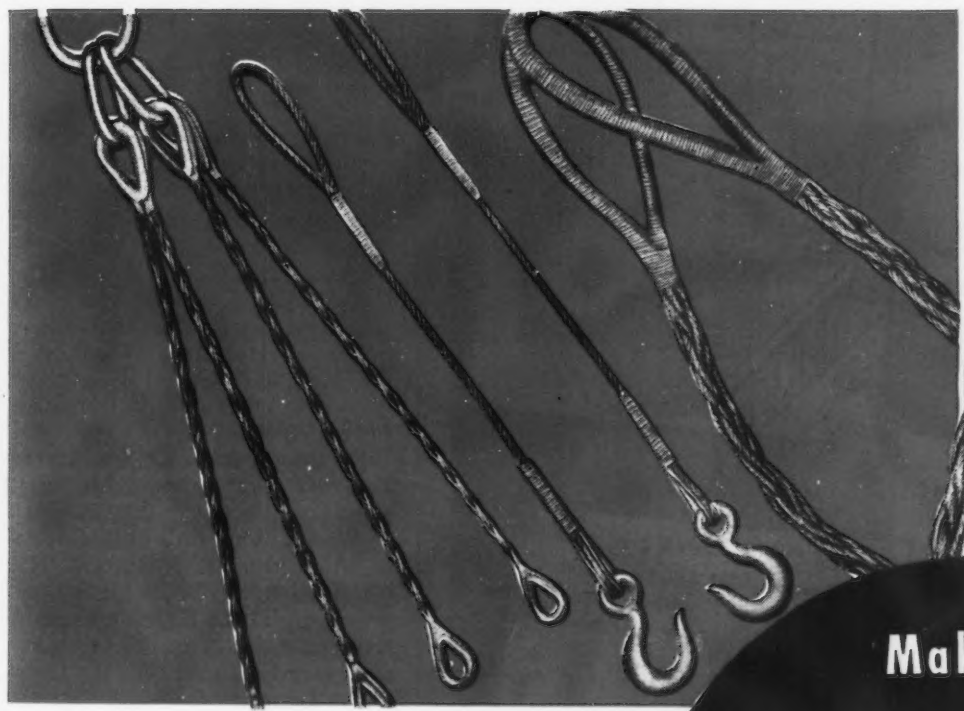

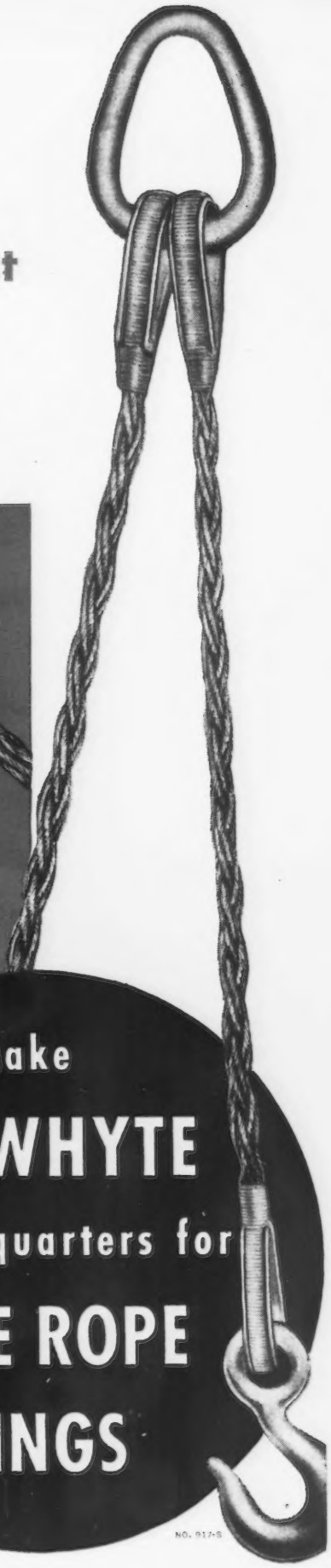

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By C. D. Bonifield
Vice-President in Charge of Production
The Globe Company, Chicago, Ill

IN our development program of continually improving the designs and production of our machinery for the meat packing industry, we have found it helpful to think in terms of arc welded steel construction. This affords a highly flexible approach to our problems and the end result is beneficial to the users of our products, the welded designs being strong, rigid, light-weight and of smooth, sanitary surfaces.

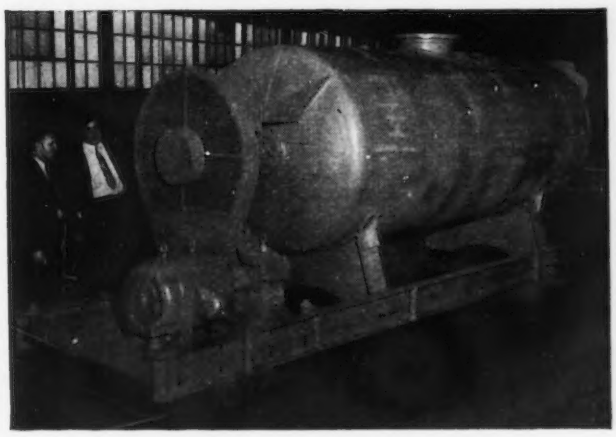

Fig. 1. Dry rendering cooker of welded construction.

One design which has been changed recently to welded steel construction is the saddle for the dry rendering cooker shown in Fig. 1. Two of these saddles support the welded pressure vessel on the welded base of this machine.

Fig. 2. Saddle support member of former design.

Fig. 3. Welded steel saddle costs 27% less than former design.

Fig. 4. Fixture used for assembly of welded saddle.

A saddle of former construction is shown in Fig 2. The welded steel saddle, shown in Fig. 3, is produced at a total saving of 27% in cost over the former design.

The welded saddle, 60″ wide, 24″ high and 8″ deep, is fabricated from ½″ mild steel plate, consisting of four pieces, flame-cut and brake formed. The parts are assembled in the welded fixture shown in Fig. 4, which is placed on a work table in the flat position. After tack welding the parts together, the assembly is removed from the fixture and finish welded as shown in Fig. 5, with the saddle positioned for downhand welding of all joints. This requires continuous, two-pass fillets on both sides to join the flange to the web. The end pieces of the flange are butt-welded on both sides to the top flange assembly.

Fig. 5. Joints are positioned for downhand welding.

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(1) Temperature Control:

Construction features of Leslie temperature regulators and controllers are highlighted with sectional illustrations. Bulletin No. 464 also lists design points incorporated in these instruments, which include stainless steel main valves hardened to 800 Bhn. Both self-contained regulators and external pilot operated controllers are featured. *Leslie Co.*

(2) Steel Doors:

Several types of steel doors for hangars and industrial use are illustrated in booklet. Industrial types are power or hand operated. Drawings on structural details are included and complete specifications are given for each type. *Truscon Steel Co.*

(3) Milling Machine:

Features of the Type BL Pratt & Whitney-Keller machine, which automatically reproduces shapes through tracer control and electrical circuits, are described and illustrated. Applications in toolrooms, die shops, metal pattern shops, plastic mold shops and experimental departments are listed with information included on principles of operation and construction details. *Pratt & Whitney Div.*

(4) Cutting Oil:

Information on Silver Chip, a synthetic non-petroleum cutting oil, has been compiled in an illustrated brochure. When mixed with water as prescribed, this oil is described as producing a water-coolant comparable to sulfurized straight cutting oils from the standpoint of smooth finish on alloy steel, stainless, bronze, copper and aluminum. *Machinery Lubricants, Inc.*

(5) Gear Pointing:

Form 60 presents the Cross 60 series machines developed for pointing and chamfering spur, helical and bevel gears; also splines. Close-up photographs illustrate typical applications such as pointing internal clutch teeth of a synchromesh second speed automotive gear. *Cross Co.*

(6) Comparator Screens:

Photographs, descriptions and prices of various types of standard glass screens for J & L optical comparators have been included in form No. 471. Clear or frosted glass screens with outlines on the front surface and overlay screens, clear or frosted, with outlines on the back surface, are available in five sizes. *Jones & Lamson Machine Co.*

(7) Caustic Soda:

The story of caustic soda; its forms, characteristics, commercial uses and plant facilities for production, is told in form 100. This 72-p booklet includes information on subjects such as unloading, handling and storage procedures and transportation methods. *Pittsburgh Plate Glass Co.*

(8) Press Feeds:

Hitch feeds and die feeds are the subjects of two folders which discuss these types from the point of view of punch press profits. The material is concisely presented with features and applications emphasized by diagrams and sectional illustrations. Specifications on available models are included. *H. E. Dickerman Mfg. Co.*

(9) Industrial Finishes:

Uses of several chemicals for industrial finishes are briefly described in folder. Reference is made to additional literature available under the description of these chemicals. *Monsanto Chemical Co.*

(10) Groove Pins:

Catalog No. 7 is offered to design and production engineers as an aid in the selection of pin fasteners. Groove pins and drive studs are included. The grooving principle is explained diagrammatically and typical applications are pictured. Illustrations and similar data have also been included on drive studs. *Groov-Pin Corp.*

(11) Gauges:

The company's line of industrial gages which includes recalibrator, pressure, vacuum, compound, altitude, hydraulic and ammonia types as well as diaphragm attachments and two dial thermometers, are included in this folder. Each type is pictured with descriptive information and specifications. *Jas. P. Marsh Corp.*

(12) Stainless Steel:

The role played by stainless steel in the development of the petroleum industry and its future applications in the varied phases of production and processing of oil, is explained in a 35-p brochure. *Allegheny Ludlum Steel Corp.*

(13) Refractories:

Complete information on a line of heavy-duty refractories for production furnaces has been included in catalog R-1-Q. Typical of the topics included is selection of refractories, specification of refractories and general properties of Alundum refractories. Considerable data is provided in table form. *Norton Co.*

(14) Springs:

All types of extension, compression, torsion, spiral and flat springs, wire forms and spring stampings made to customer specifications, are included in catalog 47. Important data is listed in an extension and compression spring design chart. *Reliable Spring & Wire Forms Co.*

(15) Machine Tools:

Applications of special equipment and a standard line of machine tools including drilling, boring, tapping and keyseating types, are presented in bulletin 2-1947. All types are illustrated with drawings showing design points, and specifications are included. *Baker Bros., Inc.*

(16) Stainless-Clad Steels:

Bulletin 338 describes Lukens stainless clad steels and gives applications for the most important types. Major manufacturing steps are illustrated to show how uniformity of cladding thickness is maintained and a permanent bond insured. Size and weight tables and corrosion data are included. *Lukens Steel Co.*

(17) Machine Tools:

Bulletin 471 has been issued to tell the story of the manufacture of special machines, special tooling and dies, and to give the background of this manufacturer's experience. Numerous illustrations show the plant, shops and various manufacturing operations as well as finished products. *Bunell Machine & Tool Co.*

(18) Miniature Bearings:

Bulletin on miniature ball bearings for precision instruments and mechanisms, describes radial, super-light radial, pivot, angular contact and thrust types. Specifications are given, including load ratings recommended for average typical requirements. Applications cover wide temperature ranges. *Miniature Precision Bearings, Inc.*

(19) Electric Circuits:

A 76-p book on industrial electrical circuits covers the applications of Cannon plugs in a number of industries and processes including railroads, aviation and welding. Ideas are presented for assembly, servicing, maintenance and portability of electric equipment through the use of connectors. *Cannon Electric Development Co.*

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(21) Chains:

Steel-fabricated and cast chains for all types of industry are featured in bulletin No. 46-10. Photographs show typical examples of application and standard attachments and their use. Information is included on cast and cut tooth sprockets. *Chain Belt Co.*

(22) Steel Hardening:

Bulletins No. 1054 and 1053 describe a high speed steel hardening process and equipment for use in the process. The first contains information on the Sentry Diamond Block method of atmospheric control and a line of electric furnaces. The second covers accessory equipment. *Sentry Co.*

(23) Magnetic Pulleys:

Catalog No. 146 describes and illustrates the design and construction of Memco high power magnetic pulleys, both air-cooled and solid types. A table of standard sizes, giving dimensions, weights, capacities, etc., is included. *Magnetic Engineering & Mfg. Co.*

(24) Iron Powders:

Technical data on carbonyl iron powders in this 33-p booklet follows an introduction which explains manufacturing techniques. Magnified illustrations included with the data show particle arrangement of various types under different conditions. *General Aniline & Film Corp.*

(25) Blast Cleaning:

Bulletin No. 214 titled "Rotoblast, Airless Blast Cleaning," has been prepared to present a clear picture of centrifugal force directing abrasive against work to be cleaned with sufficient velocity to remove scale and burnt sand from castings and other metal parts. Typical applications are described. *Pangborn Corp.*

(26) Lead Measuring:

A description of the No. 12H lead measuring instrument for checking accuracy of helical and other surfaces is given in folder. Important design points are emphasized with diagrams and close-up views. *Fellows Gear Shaper Co.*

(27) Lock Washers:

Applications of lock washers designed to increase grip when assemblies are subjected to vibration, are illustrated in bulletin No. 8. Special types designed to speed assembly and reduce material cost are shown. *Shakeproof, Inc.*

(28) Lost Wax Process:

Literature on precision casting by the lost wax process includes folders on suggested equipment, accessories, wax tools, a wax injector, related subjects and price lists. A catalog is included on Kerr industrial precision casting equipment and materials. *I. Shor & Co.*

(29) Openside Planer:

Bulletin No. 55 contains information on the Gray Openside Planer Cub which is available in 24, 30 and 36 in. sizes. Features of the planer such as non-metallic table ways, simplified drive system, forced lubrication and centralized control, are fully described with sectional illustrations and diagrams. *G. A. Gray Co.*

(30) Refractories:

Several types of fire brick and other furnace refractory products are illustrated and described in this catalog. How quality is controlled is explained with several illustrations of tests. *Robinson Clay Product Co.*

(31) Carbide Tool Salvage:

A catalog illustrates the possibilities of carbide salvaging operations on milling cutters, drills, reamers, counterbores, spotfacers, centers, special cutters and centreless grinder rest blades. Facilities for altering standard tools for special jobs are also presented. *National Tool Salvage Co.*

(32) Salt Baths:

A brief description of several heat treating salt baths with suggested uses for each is contained in catalog. Table shows Fahrenheit temperatures commonly encountered in salt bath heat treating transposed to exact and rounded degrees Centigrade. *A. F. Holden Co.*

(33) Engineering Materials:

This DC Silicone catalog lists all of the company's silicone products now available with charts and graphs and describes the properties of this family of organo-silicone-oxide polymers. Compounds and greases, fluids, varnishes and resins, and silastic types are included. *Dow Corning Corp.*

(34) Spray Equipment:

Guns and nozzles designed to reduce air and water consumption through controlled delivery in cleaning operations are listed in catalog No. 18. Included is a foundry core-blackening spray gun which also may be used as a vacuum suction tool to remove sand from molds and foreign substances from crevices. *Lonn Mfg. Co., Inc.*

(35) Lift Trucks:

Facts about the motorized Hydrolectric lift truck designed to permit one man do the work of four, are presented in a folder. A cutaway view of the unit has all main features identified with important details pointed out. Dimensional specifications are included. *Lift Trucks, Inc.*

(36) Air Power Units:

How repetitive manual operations may be performed 30 to 500 pct faster with Controlled-Air powered devices, is explained in this folder. Many applications on operations such as drilling, tapping and milling, are illustrated. Units are also designed for light assembly applications. *Bellows Co.*

(37) Flange List:

List No. 225 illustrates and describes a variety of forged steel flanges with sectional drawings, specifications and list prices included. Tables show American standards for threads, dimensions of wrought pipe, and working pressures of wrought steel pipe. *Kropp Forge Co.*

(38) Cutting and Drilling:

Detailed information and specifications are presented in 73-p catalog on end mills, router bits, center drills, countersinks, counterbores, die sinking cutters, corner rounding tools and special tools. Information on subjects such as speeds and feeds has been compiled in table form. *Melin Tool Co., Inc.*

(39) Condensing Units:

Information on the motor, compressor, condenser and liquid receiver of J & H condensing units is presented in folder. Cutaway illustrations are used to show the features of each. *Jack & Heintz Precision Industries, Inc.*

(40) Polishing Machinery:

Single and variable speed polishing lathes, abrasive belts, automatic and cylindrical finishing machines are described and illustrated in catalog No. 55. Variable speed machines have range of from 1500 to 3000 rpm and may be adjusted for required speed through dial control while machine is running. *Hammond Machinery Builders, Inc.*

(41) Analytical Balance:

The background and development of the modern analytical balance is the lead article in a company bulletin describing laboratory apparatus and supplies. Information on a universal tester, laboratory oven and electroanalysis apparatus has been included. *Eberbach & Son Co.*

(42) Carbide Tools:

Among the products listed in Kennametal catalog 47 are clamped-in solid round tools; tools with clamped-in blades for single grooving or cutting-off operations; axial face milling cutters; saws and router bits for woods and plastics; and solid rolls for Sendzimer cold metal strip mills. *Kennametal, Inc.*

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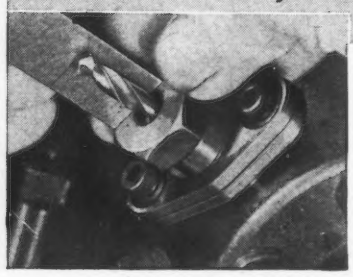
GIVES GREATER ACCURACY IN "Tight Spots"



Note reduced overhang on B & S Automatic. Standard jobber drill is gripped on flutes.

How it looks on the outside.

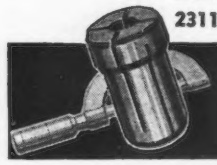
How it looks on the inside.

Redesigned for heavier jobs, Erickson's Adjustable Floating Holder for Brown & Sharpe "00" Automatics has huskier flanges and adjusting screws. Not only longer wear and endurance; increased accuracy, too, since overhang has been reduced to 27/32" to give greater rigidity with maximum clearance. Same collet is used, each collapsing 1/32" overall. Holder grips solidly and uniformly throughout collet's length; permits stubbing, lengthens tool life. Range ¼" down to No. 80 (.013") drill.

Ask for Catalog "X-6" or Erickson engineer

ERICKSON TOOLS DIVISION

2311 Hamilton Ave., Cleveland 14, Ohio



ERICKSON = *Collet Chuck Precision*

over 90% OF YOUR MATERIAL HANDLING REQUIREMENTS

can be met with

STANDARD EUCLID CRANES,

whether they are put to Special or General Purpose use. Standard Euclid Cranes are available in capacities of 3, 5, 7-1/2, 10, 15, 20 and 25 tons in various spans.

All detail parts are standardized and jig machined to assure interchangeability.

High grade, wide face, coarse pitch gearing.

•

Shafts short and heavy to withstand stress.

•

Anti-friction bearings throughout.

THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON ROAD, EUCLID, OHIO

EUCLID CRANES AND HOISTS *Raise Profits*

Foundry Foundation Starts to Campaign For Foundry Courses

Cleveland

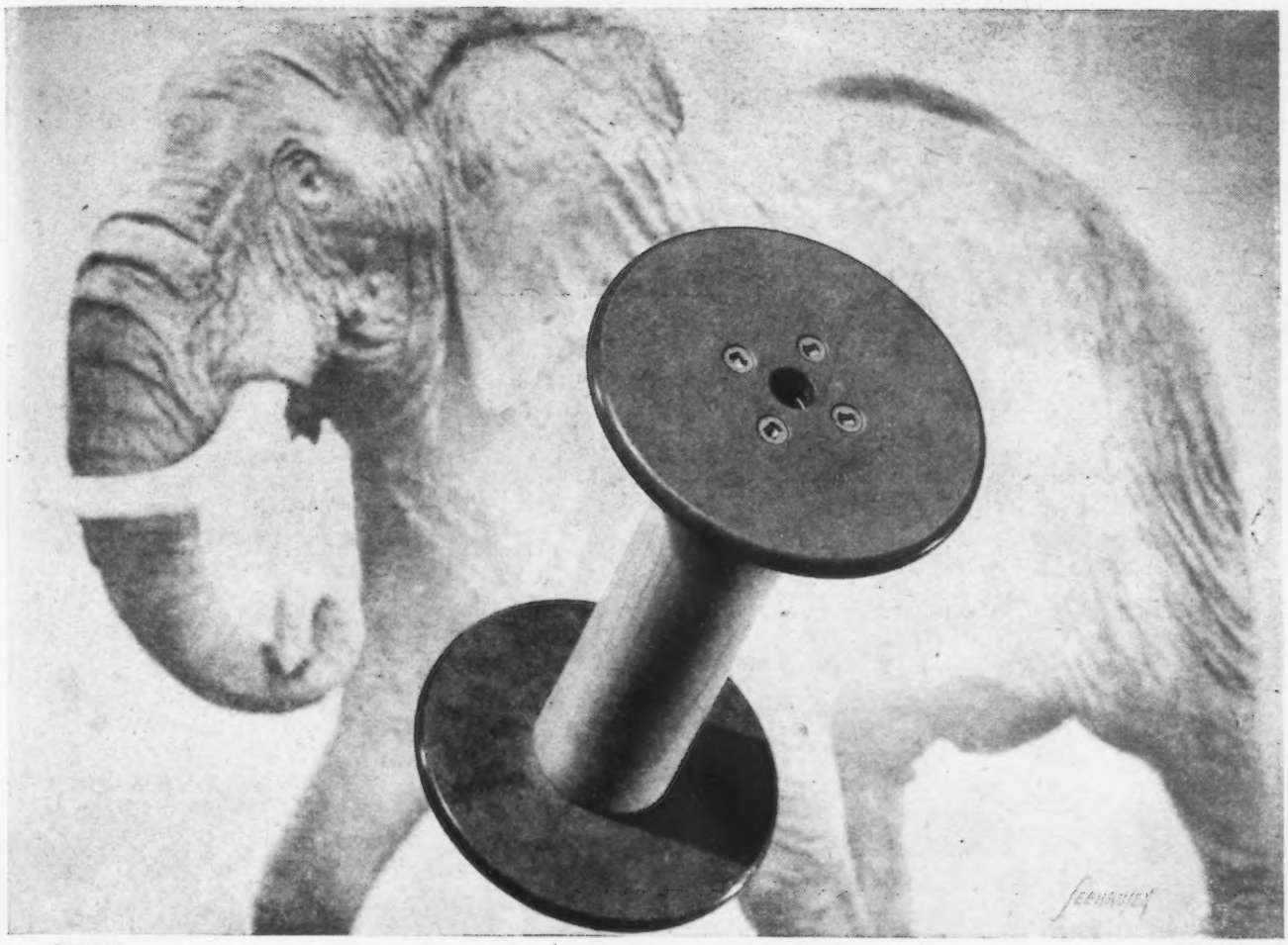
• • • **The Foundry Educational** Foundation Campaign for $280,000 to launch special foundry industry engineering training courses at 5 American engineering colleges in September and to establish 50 scholarships among these schools each year during the next 3 years is now under way.

Some 50 industry leaders are serving as regional co-chairmen to help John M. Price, campaign chairman, for contributions to this program to help solve one of our toughest problems, the continuing supply of trained manpower on the management and supervisory levels.

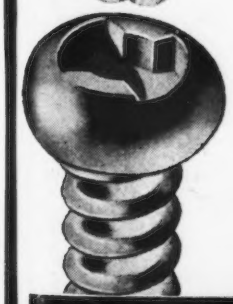
On May 8, the Foundry Educational Foundation held its first annual meeting in Cleveland, at which time four new trustees were elected and a full slate of officers were named. The Foundry Equipment Manufacturers Assn. joined the American Foundrymen's Assn., the Gray Iron Founders' Society and the Malleable Founders' Society as founding members of the foundation.

The new officers elected were as follows: President, Anthony Haswell, Dayton Malleable Iron Co., Dayton; vice-president, Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, Ohio; secretary, James H. Lansing, Malleable Founders' Society, Cleveland; treasurer, W. M. Caldwell, Gray Iron Founders' Society, and trustees: B. D. Claffey, General Malleable Corp., Waukesha, Wis.; R. W. Crannell, Lehigh Foundries, Inc., Easton, Pa.; A. Haswell; John M. Price, Ferro Machine & Foundry, Inc., Cleveland; P. E. Rentschler; Fred Sefing, International Nickel Co., New York.

Also James W. Smith, Central Foundry Div., General Motors Corp., Saginaw, Mich.; S. C. Wasson, National Malleable & Steel Castings Co., Cicero, Ill.; James T. MacKenzie, American Cast Iron Pipe Co., Birmingham; Bruce Simpson, National Engineering Co., Chicago; George Hutchins, Standard Foundry Co., Worcester, and Otto Pfaff, American Wheelabrator & Equipment Corp., Mishawaka, Ind.



TYPE "A" ASSEMBLY BIT



COMMON SCREWDRIVER

Built for a 2½ Ton Load

and CLUTCH HEAD *"the Only Screw..."*

This Lestershire Bobbin has to endure through a rugged lifetime of precision service . . . frequently taking more than 5000 lbs. stress on the 8" structure between the heads when winding high tension yarns. The makers of these bobbins, Lestershire Spool & Mfg. Co., Johnson City, N. Y., say:—

"We had all kinds of trouble with other screws but, with the adoption of CLUTCH HEADS, practically all of our screw trouble has been eliminated . . . it has proved to be THE ONLY SCREW that does not loosen under pressure and vibration.

"The high torque required to drive a 2" length screw endwise of the grain into hard maple previously *broke the driver, broke the screw head,* or *stripped the driving recess.*

"Using CLUTCH HEAD Screws took us out of all this trouble and sent our PRODUCTION UP A STRAIGHT 50%.

"Damage from driver skidding was a serious and expensive item . . . which your screw has eliminated.

"Our operators are 'for' your all-square, non-tapered driving engagement . . . they vote it easier and safer".

These definite factors for higher production and lower cost, plus smoother and safer operation, merit your investigation of CLUTCH HEAD'S *exclusive features. You may do so at your own desk. Just send for illustrated Brochure, package assortment of screws and sample Type "A" Bit.*

CLUTCH HEAD · SCREWS ·

UNITED SCREW AND BOLT CORPORATION

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HIGH SPEED SNAGGING

Get the contracts. Figure closer. But do it on the preparation end—not on the precision end. You'll find Electro HIGH SPEED GRINDING WHEELS a tremendous help in meeting both price and delivery competition. They're faster, safer, and turn out a cleaner job on any metal whether working from swing frames, floor stands or in portable machines. Learn why. Send today for our Grinding Wheel Manual 645 in full color. It's free.

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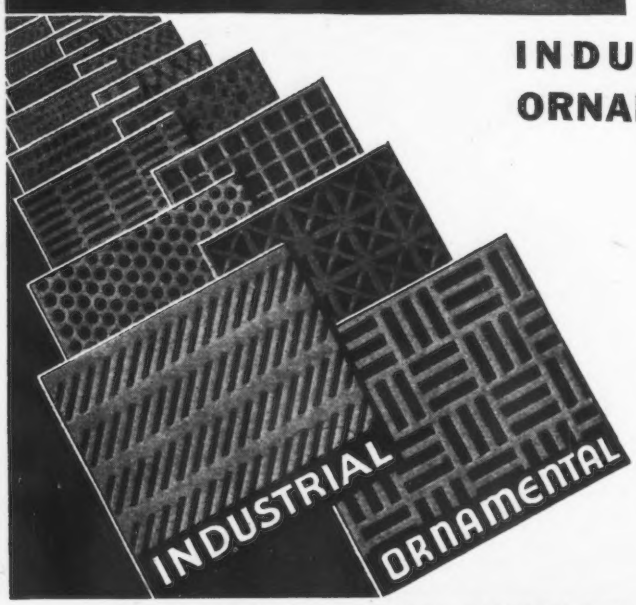

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Eastern Office: 114 Liberty Street, New York 6, N. Y.

Beehive Coke Output Aiding Steel Industry During Coke Shortage

Pittsburgh

• • • **While beehive** and rectangular coke production for the long term is being replaced by the byproduct coking process, nevertheless production of beehive coke is a life saver to industrial coke users. It was believed that with the end of the war, beehive coke output would decline sharply, especially in the face of new byproduct coke plant construction by many of the major steel plants.

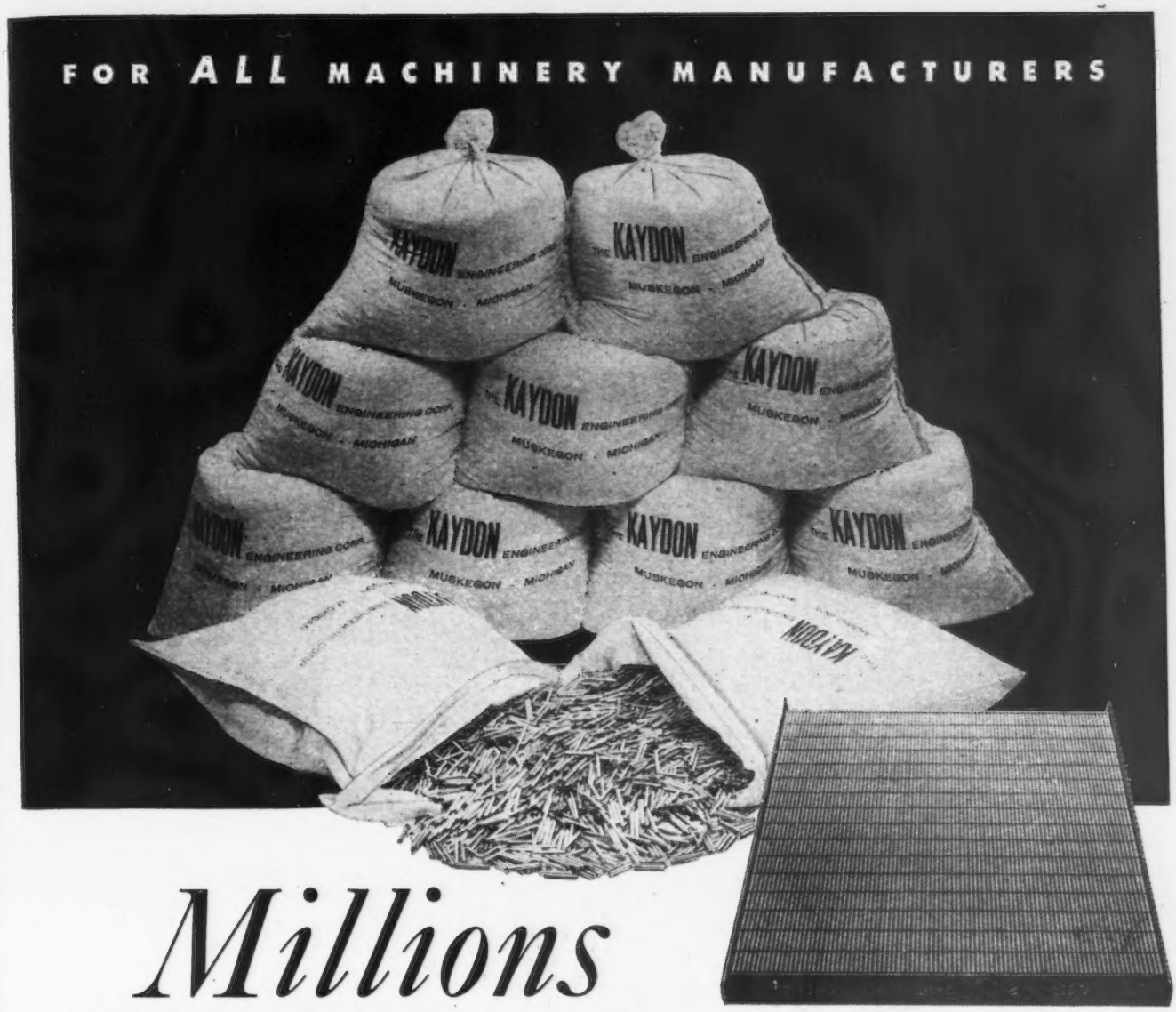
During the first week in May, however, beehive coke plant operators in Connellsville and Latrobe areas of western Pennsylvania had 8444 ovens working out of a total of 10,377 available. These operative ovens are owned by independents as well as captive producers. More than 5000 available ovens are owned and operated by the steel companies, while production from many of the privately-owned ovens finds its way to steel mills and foundries.

The H. C. Frick Coke Co. has 2919 ovens available, with 2899 operating. Hillman Coal & Coke Co. has 1424 ovens, with 1378 in production. Pittsburgh Steel Co. has 400 ovens, and is operating 250; while Republic Steel operates 218 out of 296 available ovens.

Unquestionably, in areas other than the Connellsville and Latrobe districts, the situation is somewhat the same. Jones & Laughlin Steel Corp., at its Aliquippa plant, is currently operating two banks of 120 ovens each, pending completion of its byproduct coke oven expansion program.

Thus, while an obsolete and expensive process, beehive coke production is tiding the steel industry and the foundries over a period of severe coke shortages. Foundries in the Pittsburgh area indicate that one of their major problems is to obtain coke. Further, foundry operators state that coke producers, in trying to speed up coke production, have permitted quality to fall off. Thus, the increase in tonnage output of coke is more than balanced by the greater requirements to produce an equal tonnage of casting metal.

FOR *ALL* MACHINERY MANUFACTURERS



Millions

of KAYDON *precision needle rollers

*Tolerance on diameter .0002". On the Inspection Board shown above are KAYDON Needle Rollers .1250" diameter.

The success of KAYDON Precision NEEDLE ROLLERS in automobile and truck transmissions, universal joints, clutches, steering gears and other products, has led to their use in practically all types of machinery.

Since these needle rollers may be used between hardened shafts and hardened bores of housings or gears, they eliminate the need for bearing races. Thus they provide the most compact high-capacity anti-friction bearing possible, requiring little or no more space than so-called plain or "solid" bearings.

Millions of these precision needle rollers are being made in standard sizes, 1/16" to 5/16" diameters (tolerance .0002" on diameter), flat or rounded ends. Other sizes are being added as "standard" when quantities warrant.

By using standard sizes that are now in big volume production, you get the benefit of low cost for highest performance-proved quality in small or large quantities . . . but regardless of whether your machine design permits use of standard sizes or demands special needle rollers, contact KAYDON.

Be sure to state sizes and quantities when you send your inquiries.

Capacity also available now for all types and sizes of KAYDON Standard or Special Bearings. It pays to "contact KAYDON of Muskegon."

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

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All types of Ball and Roller Bearings 4" bore to 120" outside diameter

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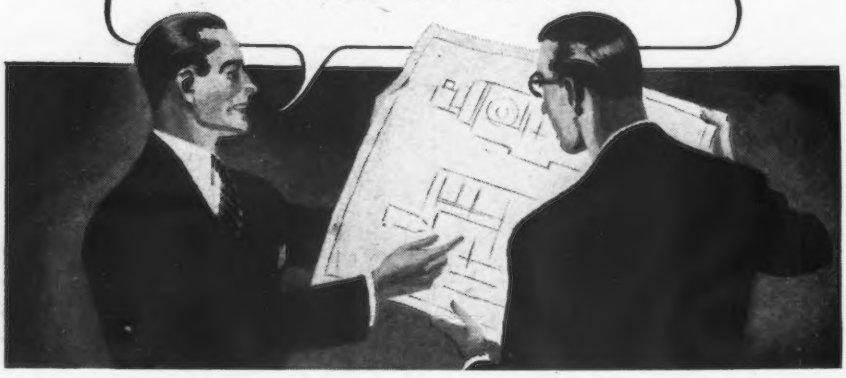

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That's the way the good word about ***Strenes Metal*** cast dies has spread from shop to shop. A number of instances are shown in our picture book titled "*Strenes Metal Castings.*" A copy is yours for the asking. Write us now while you're thinking about it.

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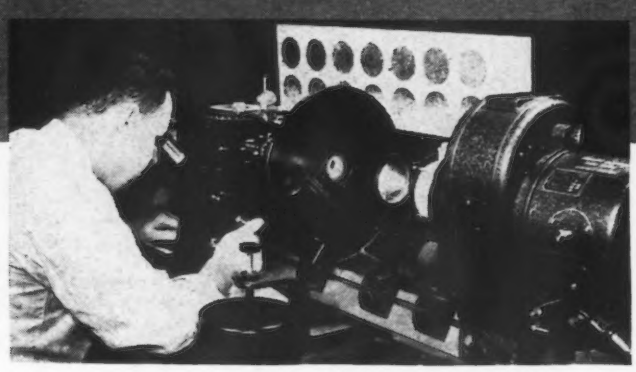

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Straight Bevel
Hypoid • Herringbone
Helical • Differentials
Spur • Worms and Worm Gears

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305 South Earl Avenue
LAFAYETTE INDIANA

FAIRFIELD for FINE GEARS

Canadian Exports And Imports Show Sharp Increase for March

Ottawa

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Imports of iron and steel and their products in March rose to $60,424,000 from $29,979,000 in March last year, with the most pronounced gains shown in rolling mill products, farm implements and machinery, nonfarm machinery, automobiles and parts, and engines and boilers.

For the month under review imports from the United States totaled $165,487,000 against $100,132,000 in the same month a year ago, while imports from the United Kingdom at $13,826,000 compare with $14,435,000 last year. Imports from Latin American countries as a group were $12,407,000 against $9,179,000; India, $2,888,000 against $2,141,000; British Malaya, $2,842,000 against $663,000; Australia, $1,526,000 against $2,002,000; New Zealand, $1,483,000 against $842,000 and Switzerland, $1,650,000 against $687,000.

Canada's export trade in the first 3 months of this year totaled $1,164 million—a 26.1 pct increase over the $923 million recorded in the first 3 months of 1946.

Booklet Lists Stampers

Cleveland

• • • **The third edition** of ""The Blue Book of Stamping Manufacturers" has been issued by the Pressed Metal Institute, Room 829 Union Commerce Bldg., Cleveland. The directory is divided into three sections: (1) Alphabetical list of institute members, both active and associate; (2) geographical breakdown of membership; (3) facilities of active members. More than 5000 requests were received for copies of the second edition of the directory.

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OPENED OR CLOSED—or in action—Kinnear Rolling Doors offer greater efficiency "from top to bottom."

They open straight upward, coiling compactly above the doorway out of reach of damage by wind or vehicles. They clear the entire doorway, leaving all surrounding space fully usable at all times.

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1742 Yosemite Ave. • San Francisco 24, Calif.

Offices and Agents in all Principal Cities

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

Announces Disposal Of 41 Additional War Installations by WAA

Washington

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Also Eastern States Petroleum Co., Houston; United Carbon Inc., Arkansas, San Patricio & Refugio Counties, Tex.; Cambridge Engineer Sub-Depot, Guernsey County, Ohio; Charlotte Disposal Center No. 1, Charlotte, N. C.; Wharf No. 2, Ft. Armstrong, Honolulu Harbor, Hawaii; Blue Grass Ordnance Depot, Madison, Ky. (portion), FPHA Project, Clarke City, Ind. (11.1 acres); FPHA Project, Nankin Township, Mich. (76.91 acres).

Also Foster Army Auxiliary Airfield, Victoria, Tex. (buildings only); Camp Davis, Onslow County, N. C. (chapel buildings); Curtiss Technical School, Buffalo, (buildings only); Hobbs Army Airfield, Lea County, Nev. (buildings only); Ft. Leonard Wood, Mo. (buildings only); Camp Crowder, Neosha, Mo. (buildings only); Camp Robinson, Little Rock, (buildings only); Camp Wheeler, Macon, Ga. (buildings only).

Also Apolachicola Army Auxiliary Airfield, Franklin County, Fla.; Long Beach Army Airfield, Los Angeles County, Calif.; Bridgeport Municipal Airport, Bridgeport, Conn.; Marlsby Army Auxiliary Airfield, Stoddard County, Mo.; Roswell Auxiliary

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pay particular attention to their packaging problems, employing only well constructed individual cartons and heavy, new, well nailed boxes and kegs for shipping.
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Think it over.—
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MILLDALE, CONN.

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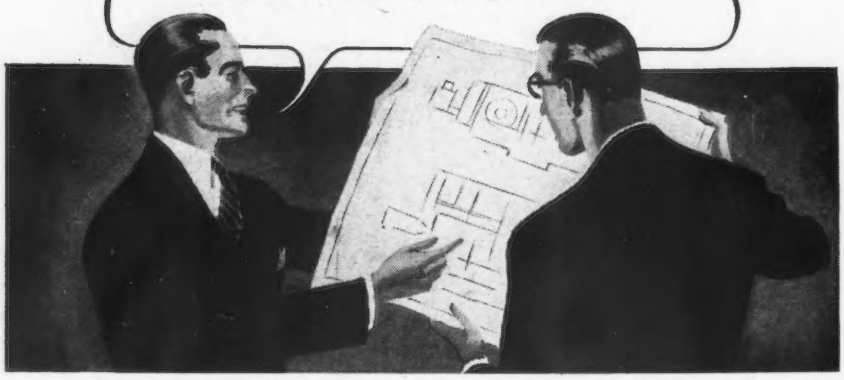

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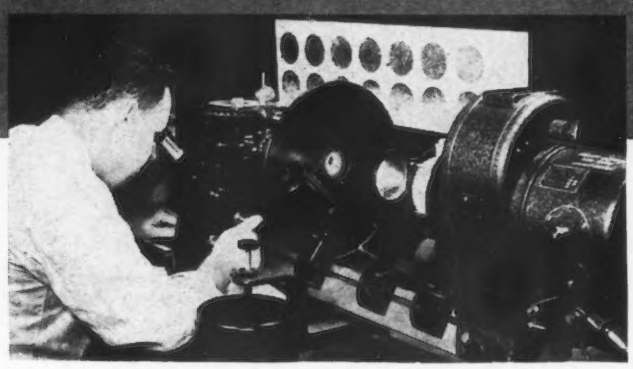

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GUARD EMPLOYEE HEALTH by installing Ruemelin Fume Collectors wherever welding operations take place. They remove noxious gases, heat and smoke at the source. Eliminate employee fatigue. Speed up welding operations. Especially valuable in winter when doors and windows must be closed. Over one thousand in satisfactory service. Many repeat orders. Write for Bulletin 37-C.

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3870 N. PALMER ST. MILWAUKEE 12, WIS.
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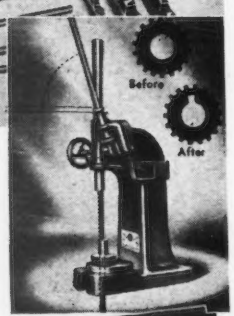


This New *Minute Man* Keyway Broach Kit Does the Job, By Hand, In **One Minute**

Cuts keyways any standard width, any depth, in pulley hubs, collars, couplings, gears, cutters or what not. Kit shown cuts 15 sizes, pays for itself in no time even if your uses for keyways are few and far between.

Write for Catalog "R" containing the whole story and prices on broaches, complete kits including keyway stock and du Mont Arbor Presses (handy to have around any shop) as well as valuable reference data.

The du MONT CORPORATION
GREENFIELD, MASSACHUSETTS

Army Airfield, Chaves County, N. M.; Plattsburgh Municipal Airport, Plattsburgh, N. Y.; Dalton Army Airfield, Vandalia, Ohio; Laughlin Army Airfield, Del Rio, Tex.; Camp Hood, Pidcoke & Coryell Counties, Tex. (15 acres); Camp Shelby, Forest & Perry Counties, Miss. (12,872.07 acres).

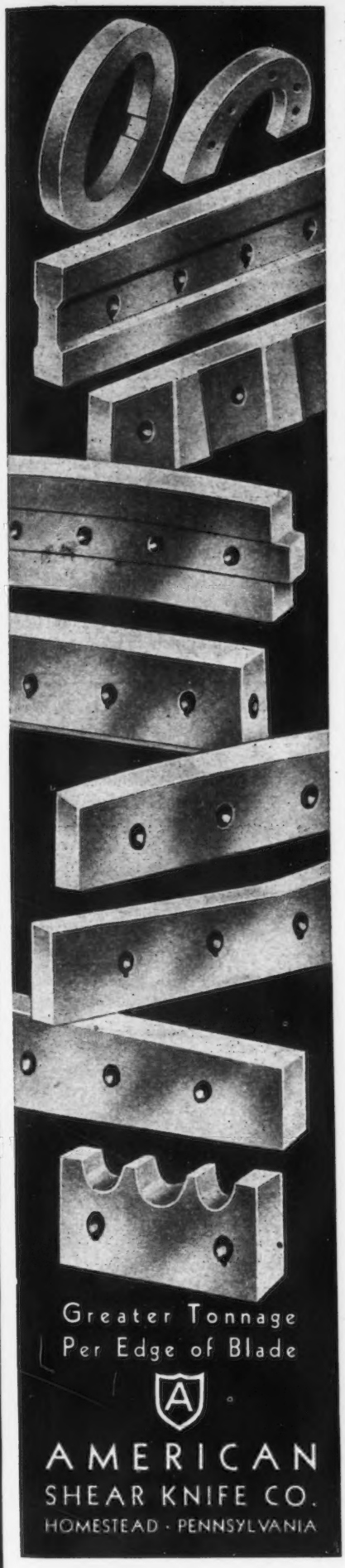
Also North Hill Fire Control Station, Fishers Island, N. Y. (18.37 acres); Camp Clark Prisoner of War Area, Vernon County, Mo. (643 acres); Haleakala Base Camp, Wailuku Maui, Hawaii; Mispillion Fire Control Station, Sussex County, Del (.52 acres); Vacant Land, (.91 acres) Railroad & Castro Aves., Richmond, Calif.; Cram Property, Casco Bay (.34 acres) Cumberland County, Me.; Landin Siskiyou National Forest, Coos County, Ore. (1000 acres) Smith Wood-Products Inc.; John W. Winningham Tract Grays Harbor (2 acres) Washington.

Declares Plastics Offer Promise to Textile Field

Shawnee, Pa.

• • • **At the National** Textile Seminar held here recently David S. Plumb, of the vinyl resins department, Monsanto Chemical Co. plastics division, declared that plastics are more a promise than a threat to the textile field. "Plastics offer functions to the textile consumer which the consumer undoubtedly wants, and at a price he can afford to pay," Mr. Plumb said. By offering a utility function, it was explained to the seminar group how plastics expand a total market.

Mr. Plumb outlined the work that had been done with plastics in the textile field during the past 2 years. He stated that this entrance of plastics into an older field has tended to follow two separate, but in many cases, parallel lines. These lines, he said, are concerned with plastic films and plastic coated fabrics. The entry of plastics into the textile fields has been extremely complex and confusing, the speaker pointed out. He said, "The time is rapidly approaching, if it is not already here, when all of this activity must become more coordinated, logical and orderly." He continued, "Each phase can then be considered in its correct relation to the textile picture as a whole."



New Booklet Critical Of Methods, Theories In the Nathan Report

Chicago

• • • **Dr. Charles O. Hardy,** former economist of the Chicago Assn. of Commerce and Industry, is the author of a booklet just published by the association. The booklet is an analysis of the Nathan Report and was started by Dr. Hardy before he left the association early in April to become staff director of the congressional joint committee on the economic report, headed by Senator Taft. In the report, Dr. Hardy declares, "Raising of all wages to compensate for increases in living cost will only accelerate the advance in the cost of living and divert a larger share of scarce goods to wage earners from people whose incomes have not increased."

Dr. Hardy's study, "Wages, Profits and the American Standard of Living," is severely critical of the statistical methods, economic theories and conclusions of the Nathan Report. He charges that some of the alleged facts in the report do not exist, that there was a careful selection of dates in compiling statistics so as to get desired results, and that the "most important issue of principle involved in the report," the doctrine of the importance of mass purchasing power, is fallacious. The free economy system is implicity challenged by the Nathan Report, according to Dr. Hardy, and Nathan's program could be made effective "only by reviving OPA as a permanent agency and staffing it with adherents of the doctrine of a planned economy."

The economist declared that industry has enjoyed other advantages in the form of low sales costs, large volume, and prices that in some cases reflected temporary scarcities, but sellers' markets are always temporary.

He concluded, that every class in the community has more to gain from a continuation of the upward sweep of per capita production than through any possible advantage it might wrest from other classes by changing the pattern of distribution. The gain is due almost entirely to investment financed out of past profits and motivated by the hope of future profits.

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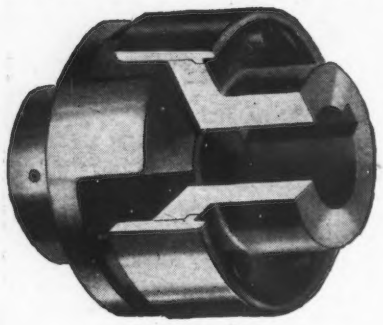

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SAE Meeting

(CONTINUED FROM PAGE 129)

re-enacted by Kenneth A. Hopkins, of the George W. Walker organization, Detroit, and Virgil M. Exner of Studebaker Corp., South Bend. Said Mr. Exner, "Tomorrow's car will be functional and beautiful." Said Mr. Hopkins, "Tomorrow's car will be beautiful and functional." They went on from there, although both agreed that automobile design primarily must be functional and that tomorrow's car can both be functional and beautiful.

Design from the ground up and development along radical lines of a reinforced plastic automobile which "breaks with horseless carriage tradition" were described by Louis A. Werner, engineering consultant, of Detroit. Mr. Werner said the chassis-less vehicle is suspended on air bellows fed from an expansion tank which controls ride softness and maintains constant road clearance.

The body, which carries loads normally absorbed by the chassis, was said to be comprised of 10 parts, each separately molded from plastic reinforced by glass cloth, and then joined. The rear-mounted engine was said to form a unit with axle and transmission, while a new two-wire electrical system operates all controls and instruments, even door locks.

Julius Gaussoin, of Silver Eagle Co., Portland, Ore., explained that improvements in air-brake design, installation, and operation are necessary. He said the tests disclosed that whereas a passenger car can stop in 22 ft from a speed of 20 mph, a truck-trailer combination needs 52 ft. He ascribed the difficulty in part to brake-operation "lags," reporting data to show that truck-trailer combinations actually can be stopped in shorter time and space when front-wheel brakes are not used and when the rest of the air-brake equipment is adjusted to make the brakes function more quickly.

It was revealed before a symposium on automatic transmission components that the change is likely to be a stage operation, for engineers scarcely have begun to approach unanimity of opinion on the successor mechanism. They are agreed, apparently, that gear-

shifting can become automatic; even that a continuously-variable ratio transmission might be developed. However, some prefer fluid couplings, others like transmissions with hydraulic control and governor, still others seek different methods and mechanisms to accommodate varying torque requirements.

A. Elliott Kimberly, of Chrysler Corp., Detroit, championed the fluid coupling, or combination of fluid coupling and gearing which, he insisted makes passenger cars easier to operate, protects the drive mechanism, and contributes to smoothness of power flow. Furthermore, he added, the fluid coupling is highly practical and can be mass-produced at reasonable cost.

"It was once said," Mr. Kimberly commented, "that 'all great truths are fundamentally simple,' and this most certainly applies to the fluid coupling. Many thousands of dollars have been spent in attempts to improve upon the performance of this simple, basic design, analogous to the two scooped-out grapefruit halves facing each other, by the addition of extra elements. Yet in sizes suitable to automotive use, the basic unit, with slight modifications, has given very satisfactory performance in a large number of European and American passenger cars."

O. K. Kelly and M. S. Rosenberger, of General Motors Corp., De-

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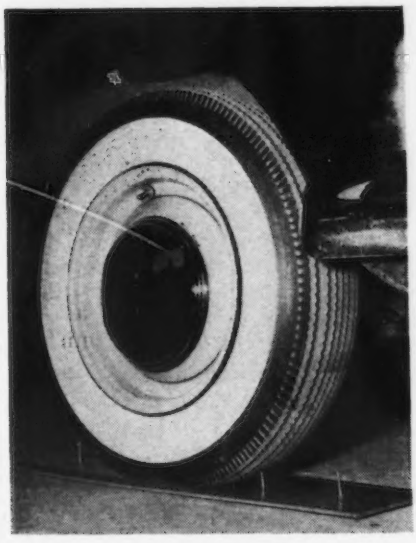

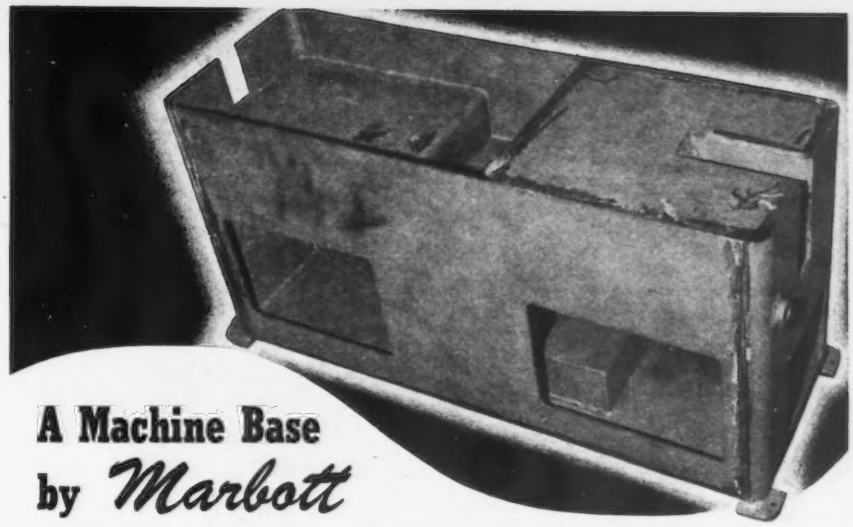

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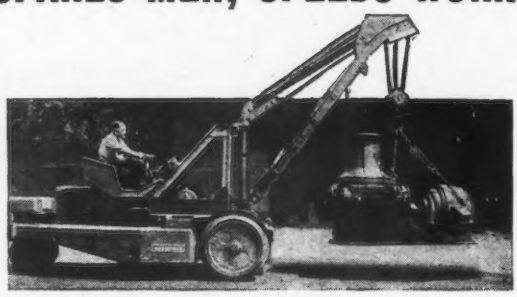

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troit, presented the case for the automatic transmission, which changes gears without conscious effort on the driver's part.

"We feel," they explained, "that there should be nothing new for the driver to learn; that he should be allowed merely to hold his foot on the accelerator to the degree of performance he wishes and the automatic control should do the rest."

Names Nine Members Of Metals Society To Nominating Committee

Cleveland

• • • **Nine leading** members of the American Society for Metals have been appointed by the society president, A. L. Boegehold to comprise the ASM nominating committee for 1947, whose duties wil be to represent the society's 21,000 members and 71 chapters in the United States and Canada in the selection of nominees for the offices of president (for 1 year), vice-president (for 1 year), treasurer (for 2 years), two trustees (for 2 years each).

Elections will be held at the annual meeting of the society, which will take place in Chicago in October as a part of the National Metal Congress and Exposition.

Members of the nominating committee are: Chairman, A. H. d'Arcambal, vice-president, Pratt & Whitney Co., West Hartford, Conn., representing the Hartford chapter; C. K. Lockwood, Shawinigan Chemicals, Ltd., Montreal, representing the Montreal chapter; S. P. Watkins, manager development engineering department, Rustless Iron & Steel Div., Baltimore, representing the Baltimore chapter; Dr. R. J. Radebaugh, University of Rochester, representing the Rochester, N. Y. chapter.

Also Arthur Winston, assistant to the director, magnesium division, Dow Chemical Co., Midland, Mich., representing the Saginaw Valley chapter; Thomas G. Harvey, Monarch Steel Co., Indianapolis, representing the Indianapolis chapter; Dr. R. L. Dowdell, School of Mines and Metallurgy, University of Minnesota, Minneapolis, representing the Northwest chapter; W. E. Burndrett, chief inspector, Hughes Tool Co., Houston, representing the Texas chapter.

Weekly Gallup Polls

(CONTINUED FROM PAGE 123)

College	74	22	4
High School	66	28	6
Grammar School or Less	56	35	9

It is one of the ironies that the lower income, least educated groups, while being the ones whom communism would allegedly help most, are the groups which consistently show the least friendliness toward Russia.

•

• • • **As Congress considers** the question of tax reduction, three out of ten among the American voting public say they are having a harder time financially this year than they had last year.

Four out of ten say their financial situation remains unchanged from last year.

And three out of ten say, despite the inflationary price level, that they are better off financially this year than last year. These people possibly are now making more money than last year or have perhaps paid off bills which burdened them last year.

The institute found these facts when it had field reporters all over the United States put the following question to a cross-section of the voting population:

"Are you better off or worse off, financially, than you were a year ago?"

The replies of everyone:

	Pct
Better off	31
Worse off	31
About same	38

Women are more inclined to say they are worse off this year than men are. So are manual workers, skilled, semiskilled, and unskilled workers.

Replies to the question among various population groups are given below:

	Better Off Pct	Worse Off Pct	Same Pct
SEX			
Men	34	30	36
Women	28	32	40
OCCUPATIONS			
Business & Professional	36	30	34
White Collar	35	31	34
Farmers	36	21	43
Manual Workers	27	34	39
Union Members	30	35	35
AGES			
21-29	44	28	28
30-49	31	33	36
50 & Over	22	30	48
Veterans	44	29	27

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